GENERAL LIBRARY OCT 12 1918 UNIV. OF MICH. CHEMICAL LIBRARY

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CXLIII. No. 2886.] LONDON, SEPTEMBER 3, 1918. [70th Year. Price 6d.

O'NEILL'S

OXIDE

GAS PURIFICATION AND CHEMICAL CO., Ltd.

PALMERSTON HOUSE, LONDON, E.C.

Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 London Wall.

TORBAY JOINT STOPPING

FREE FROM LEAD.

The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C. 3.
39/41, Old Hall St., LIVERPOOL.

KOPPERS' PATENT

CHAMBER OVENS.

Results obtained which have never been Surpassed by any other System of Carbonization.
Plants at Work and under Construction for the production of **70,000,000** cubic feet of Gas per Day.

See our large Advertisement appearing in alternate issues of the "JOURNAL."

The KOPPERS'
COKE OVEN AND BYE-PRODUCT CO.,
301, Glossop Road, SHEFFIELD.

GAS & CANNEL COAL CONTRACTORS.

WM. F. RUSSELL & SONS.

Telegrams for all Offices: "MONKLAND."

GLASGOW: 90, Mitchell Street;
NEWCASTLE: Exchange Buildings;
HULL: Exchange Buildings, Lowgate;
LIVERPOOL: 5, Castle St.; &
SWANSEA: Atlantic Buildings.

W. PARKINSON & CO.

(Incorporated in Parkinson and W. & B. Cowan, Ltd.),

LONDON & BIRMINGHAM.

(See Advertisement p. 430).

R. & W. HAWTHORN LESLIE & CO., LTD.

In Stock.

TANK LOCOMOTIVES

Always in Progress.

Locomotive & Marine Engineers & Shipbuilders.

NEWCASTLE-ON-TYNE.

INTERMITTENT VERTICALS.

Adopted all over the World.

Vertical Gas Retort Syndicate LTD.,
17, VICTORIA ST., WESTMINSTER, S.W.

Sole Agents for Australasia—
JAMES HURLL & CO. LTD., SYDNEY.

JAMES McKELVIE & CO.

Coal Owners,

Gas and Steam Coal Contractors,

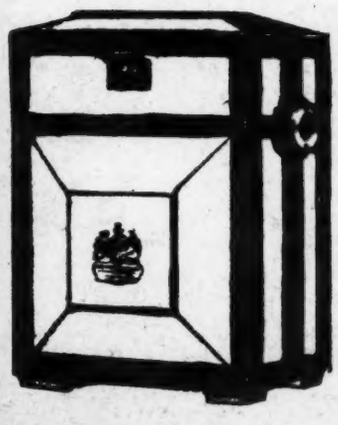
17, RUTLAND SQUARE, EDINBURGH.

59, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
24, CHAPEL STREET, LIVERPOOL.

ESTABLISHED 1840.

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.

TUBES & FITTINGS for Gas, Steam, Water, &c.



"Extremely Accurate and Well Made"

aptly describes George Glover's Dry Gas Meter. Giving "correct" registration at all outputs and at varying pressures, it will be found satisfactory under the most trying conditions. Every meter leaving their works, irrespective of size—and they build up to 3000 lights—is regulated and tested for soundness at 12-in. pressure, and for registration not only at the ½-in. pressure prescribed by the "Sales of Gas Act," but at 3-in. pressure with full outlet capacity so as to prevent slow registration even when the Meter is overworked. Since 1861 the

George Glover Dry Meter

has gained the highest awards at the principal International Exhibitions and to-day represents the ideal gas recorder.

PARTICULARS AND PRICES ON APPLICATION.

GEORGE GLOVER & Co LTD
RANELAGH WORKS. CHELSEA. LONDON. S W. 3.

H. MITCHELL, FOR PATENT SLOT METER PAD & OTHER LOCKS. KENTISH TOWN, N.W.

RITCHIE C.I. PIPES FOR GAS & WATER. MIDDLESBROUGH.

J. & J. BRADDOCK

(Branch of Meters Limited),

GLOBE METER WORKS,

Telegrams: "Braddock, Oldham." Telephone 815. **OLDHAM,**

AND

45 & 47, WESTMINSTER BRIDGE ROAD,

Telegrams: "Metrique, Lamb London." Telephone 2412 Hop. **LONDON, S.E. 1.**

MANUFACTURERS OF HIGH-CLASS

GAS STATION METERS.

BRADDOCK'S

STATION GOVERNORS

AND

RETORT-HOUSE GOVERNORS.

IMPROVED

WET & DRY GAS METERS

OF BEST QUALITY.

BRADDOCK'S PATENT

"SLOT" METERS.

FULL PARTICULARS ON APPLICATION.

"LEAD WOOL"

Reg. Trade Mark.

PROVIDES BOTTLE-TIGHT JOINTS FOR HIGH OR LOW PRESSURE MAINS.

Is equally suitable for Steel or Cast-Iron Pipes.
Its regular use will reduce unaccounted-for gas.
The cost of the joint being less than with molten lead, capital expenditure is reduced.

Compressors Hired for Testing Mains.
Competent Jointers sent out on reasonable terms.

When mainlaying is proposed, communicate with—

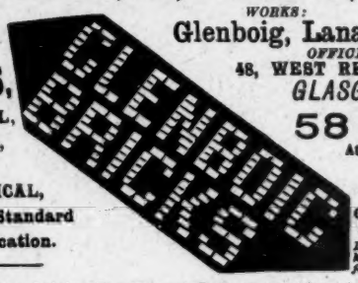
THE LEAD WOOL CO., Ltd., Snodland, KENT.

Tele.: "Strength, Snodland." Tele.: Snodland 661.

THE GLENBOIG UNION FIRE-CLAY Co. Ltd.

WORKS: Glenboig, Lanarkshire.
OFFICES: 48, WEST REGENT ST., *GLASGOW.*

GAS-RETORTS, HORIZONTAL, INCLINED, and VERTICAL, to New Standard Specification.



58 FIRST AWARDS At International and Home Exhibitions, including Grand Prize at Brussels, 1910.
In every case the highest award given for Fire Clay Goods.

The Glenboig Bricks, Blocks, and Retorts combine, in the highest degree, the qualities of not melting, and not splitting, when subjected to the highest heats and sudden changes of temperature, and are, in consequence, found to be economical, even in districts where the local bricks can be had at half the price.

RATEAU TURBO GAS EXHAUSTERS

ALSO FOR

PRESSURE RAISING AND COMPRESSING.

Manufacturers under Licence from Professor Rateau.

WE HAVE SUPPLIED AND HAVE ON ORDER—

EIGHTY-TWO MACHINES.

Total Capacity: **36,204,000** cubic feet per hour.

MAKERS ALSO OF

VALVES OF ALL SIZES & TYPES (AIR & GAS) and for HIGH or LOW PRESSURES. **DISTRICT AND SERVICE GOVERNORS.**

HIGH PRESSURE GAS PLANTS.

GAS EXHAUSTING PLANTS TO SUIT ALL CONDITIONS.

VALVES FOR COKE OVENS A SPECIALTY.

GLAND PLUG COCKS.

THE BRYAN DONKIN CO.,

LIMITED,

Engineers and Ironfounders,

Head Office and Works: CHESTERFIELD.

London Office: 3, VICTORIA STREET, WESTMINSTER, S.W. 1.

Chesterfield Telephone No. 84.
London Telephone No. 5358 Victoria.

Chesterfield Telegrams, "Donkin Chesterfield"
London Telegrams, "Donkin Vic. London."

GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLIII., No. 2886.] TUESDAY, SEPTEMBER 3, 1918. [70TH YEAR.

EDITORIAL NOTES.

Possible Development of the National Gas Council.

IT may not have been noticed that in our issue for Aug. 6 [p. 250], when referring to a meeting of the Committee of the National Gas Council appointed to deal with labour questions, it was mentioned that it was then thought desirable that consideration should be given to the possible development of the Council, with the view of making it more representative. This was in connection with the question of forming, on the invitation of the Ministry of Labour, a Joint Industrial Council on the lines of the Whitley report. For this object as for all other purposes, the Council should be thoroughly representative not only of the financial and other interests of the gas industry, but (this we regard as highly important) geographically; and it is not so at the present time. The Council has rather a curious and unsystematically constructed foundation through being constituted of the Councils of the four chief organizations of the industry; while the Executive Committee—the active part of the organization—is simply composed of the most active and most available members of the Council. Whatever development takes place—and it should take place—the National Gas Council must be the nucleus or base, as all the experience gained, all the work done and records made, in the past few critical years are too valuable to be lost to a more representative organization. Whatever form the development takes, it should ensure that it is complete and thorough, with every area in the country possessing proportionate representation, power, and responsibility—in view, for one thing, of the fact that local conditions vary so considerably in regard to almost every matter that concerns the industry. Had there from the first been on the Council equality of representation of all quarters, there would not have been the somewhat frequent grumblings and murmurings that have been heard more or less openly. We are glad of the intimation that consideration is being given to this matter.

A Grave Outlook.

APPREHENSION over the coal situation is being expressed throughout the gas industry; and the shadows of the position for the coming winter are already lengthening, broadening, and deepening. The Coal Controller's Department make no pretence that the outlook is not of a pronouncedly serious order. They are doing everything posssible, it seems to us, to prepare people for even worse conditions; but better this than the launching of surprises, as the Department has been in the habit of doing in respect of coal prices. There can be no question about it that the mistake of the authorities in not providing for a good margin of distributed stock of such a vital necessary as coal, instead of working down to a *minus* quantity, is going to inflict a severe penalty on the country during the next few months. Every scrap of economy is now being brought into account. Even collective cooking in National Kitchens for Sunday dinners in industrial areas is being officially recommended. What this would mean in the way of cooking plant and facilities for service is something that can be better appreciated by the military caterers on the Allied Fronts than by any of us at home. Again the deepened gloom of London this next winter will make it a place from which one will be glad to escape rather than be in, for it is going to be dragged further than ever from its pre-war street lighting standards so as to save coal. Long since coal in this direction might, and with greater facility than now, have been saved had the old electric arc lamps been converted to incandescent ones.

All this sudden activity in coal economizing supplies the evidence of acute need. Additional testimony is furnished by the fact that the Coal Controller states that since March last 20,000 tons per week of house coal for London has had to be diverted to gas-works and for bunkering purposes, owing to the partial cutting-off of the Durham supplies by water, consequent on the increased demands of our Allies. This diversion of house coal to gas-works happening during the summer months, what are the prospects for the winter months? They are beyond definition. Further, the principle adopted by the Controller, of now taking from those public utility undertakings that have small coal stocks, and giving to those that are clamouring for supplies to keep them alive, shows again the terribly tightened position in which he is operating—and this before winter. Those who think, in view of these evidences of shortage, that they see a prospect of relaxation of the Fuel and Rationing Order, are likely to be grievously disappointed, in view of the fact that, this being the position now, the gradually growing winter demand must outpace all the efforts of the Controller to augment output. That he will be able to foot his accounts in respect of rationing appears to us, in the present position of things, to be open to the gravest doubts.

One item of information is that the output of coal from the Durham collieries is being greatly increased. If this is correct, it will be highly satisfactory to the gas undertakings drawing their supplies from this area, especially the London and Southern ones. Inasmuch, however, as these supplies have to be so largely brought south from Durham by rail, it would be interesting to know if anything is being done to relieve the main trunk lines from congestion, so that the increased output of coal may be carried speedily to its destinations? There is something more to be done than to increase output, and that something is to spiritedly and drastically improve the means of distribution.

We see that the electricity stations are crying-out over the rapid depletion of their stocks before winter is here; and representations on the subject have been made to the Coal Controller through the Incorporated Municipal Electrical Association. Last week we mentioned that the Controller had received a deputation of representatives of gas undertakings in regard to their position; and he then mentioned that stocks would be restricted to four weeks' maximum supply, with thereafter diversion to works in need of coal. This close running is the order, despite the information that has been given to the public (we imagine through the Coal Controller's office) that managers of public utility undertakings have real cause for anxiety—particularly managers of gas-works, which are much more restricted than electricity undertakings in their choice of fuel, to say nothing of the more important point that reduction of coal supplies to gas undertakings lessens the source of high explosives and other necessaries required to prosecute the war. The electrical industry, through the Association named, has represented to the Controller that supplies of electrical energy should be maintained at all costs, and that preference in deliveries should be given to the electric undertakings. The electricity industry have only two claims upon which preference can be based—public convenience, and lighting and power supplies for munition and industrial purposes. The gas industry has all this, *plus* the more economical use of coal, the output of coke as well as of gas, the greater thermal efficiency of its process, and the supply of materials required in the war, in agriculture, and for helping to maintain the national welfare other than in light, heat, and power. Before the House of Commons adjourned, Sir Albert Stanley stated that essential industries engaged on any work of national importance must be guaranteed an adequate supply

of coal. We should prefer to see the guarantee in a more material form than a problematical four weeks' stock for gas-works and three weeks' stock for electricity stations; for taking the most liberal view possible of the situation, actual in relation to gas-works, and as presented by the Coal Controller's Department in other respects, we can only regard the coming winter with the utmost concern. It was also promised by the President of the Board of Trade that a priority system would be established in respect of coal supplies to industries—the adjudicators being a Committee composed of representatives of all Government Departments affected. When are the Committee likely to set to work, and will they hear evidence as to claims?

Mr. Jones on the Gas Industry's Position in Relation to the Electrical Schemes.

THERE is one part of the address which Mr. H. E. Jones, Chairman of the Wandsworth, Wimbledon, and Epsom District Gas Company, delivered to the proprietors last Tuesday, which was designed to stabilize the confidence of gas stock holders in relation to the grandiose schemes that have been proposed by Departmental Committees for the reformation and endowment with increased power of the electricity industry. The intention was good, as there is no need for any alarm in the gas industry, providing it deals with its position in a thorough manner. Mr. Jones spoke extempore; but we have to assume that what he said comprises his deliberate views on the whole subject. On this assumption, we can only say he has not gone far enough in his consideration of the position; and therefore his conclusions are open to criticism. He, on his own part, took it that gas stock holders had seen the published references to the electricians' plans, and how these plans are going to "wipe out" the gas industry. Nowhere, so far as we have observed, has this "wiping-out" process been put forward as part of the schemes; but, in our own columns, we have expressed the view that, if the schemes in all that they embody are sanctioned by Parliament, and if the anticipated results mature, then they will be detrimental to the interests of the gas industry.

The purport of Mr. Jones's remarks, as we interpret them, was that the gas industry has nothing to fear from the schemes, because it is already strongly entrenched in the domestic heating and cooking business, which the electricians cannot touch on the same terms, and that the schemes in question are destined for fields which the gas industry was not established to serve, and of which, therefore, they cannot now enter into occupation. He also intimated that the operation of the projects would have to be confined to the parts of the country where there are extensive industries, and where fuel can be easily obtained from the coal pits. If this is the correct reading of his remarks, then there is ample room for criticism. We are quite at one with Mr. Jones that the electricians, however great may be their schemes, cannot capture the domestic cooking and heating business, for the reasons that the thermal efficiency of electricity production is very poor, and the costs—installation, upkeep, and working—are not in the same street with gas, which has also in its favour a large span of convenience and rapidity, where rapidity is required. Further, when speaking to the Wandsworth stockholders, perhaps it was not necessary for Mr. Jones to treat the gas industry as a whole; but, as President of the National Gas Council, it is his duty, as it is ours, to do so. So treating it, the first inquiry one makes is: What is the intention of the reorganization of the electricity industry on a national basis, and the large generating schemes? Whether or not the intention will materialize is a matter on which speculation would be useless. The answer to the inquiry is to realize economy, and to put into the distributing cables electric energy for power or heating at a cheaper rate than can be done in present circumstances. Therefore, wherever these stations are established, or wherever concentration of generating plants is brought about through Electrical District Boards and the supersession of uneconomical stations, *if*—we emphasize the "if"—their electricity can be produced and distributed at a cheaper rate, it will make, at any rate, some inroads into domestic heating and cooking (which is the business that Mr. Jones marks out for the gas industry), unless a good combustible gas can be produced which, by its very cheapness, will make gas a still more formidable competitor. We admire the faith that is in the veteran gas engineer; but we see the necessity of not, if it can be avoided, losing any part (rather would we enhance it) of the margin of advantage which gas now possesses over electricity as a heating agent. This is a question of policy that the responsible men of the industry have to fully investigate and act upon, and not regard in any passive spirit.

It may be confessed that much over a hundred years ago the gas industry was not established with any idea of occupying fields of which the electrical schemes seek to-day to take monopolistic possession. Neither was the electricity industry less than forty years ago. The gas industry was not established to take up the work of domestic cooking and heating or industrial power and heating. But in all these directions it has developed in a perfectly natural way to the national advantage. There is every reason now why its ideals and the work of its men should embrace much larger developments, even may be to the supply of lower grade gas in compact industrial areas. The General Acts governing electricity supply, passed in the eighties, incorporate the word "lighting" in their titles. But the electricity industry to-day is well in the power field; and it is working hard to get more and more into industrial heating, as well as into domestic cooking and heating. The gas industry must not look to the present strength of its own position acting as a sufficient dam to the economic and commercial efforts of the electricity industry. If it did so, it would be false to itself. It has to see that its trading armoury is kept equipped with all the implements and necessaries requisite to the advances of modern competition, and not anywhere give ground which can, by developments of its own, be saved or gained. Industrial power and heating are outlets for the gas industry. They provide business scope for coke, as well as for producer gas made from coke; and, in the smaller industrial requirements, a combustible gas quite suitable for domestic purposes will also supply a cheap fuel. We must not, in the interests of gas consumers generally, allow any of the new electrical projects to annex territory through default or inertia on the part of the gas industry, which has to ascertain what developments it is capable of in respect of and from its own methods and products. Development of business obtained (say) by advances of economy in production plays a large part in the general economy of a concern, and in increasing the ability to sell cheaply. In this connection, Mr. Jones is found to be to an extent illogical when remarks in one part of his address are compared with those in the part with which we are now dealing. In referring to the Fuel and Lighting Rationing Order, he spoke of the reduction of consumption that was likely to follow, and that this reduction would, per unit of gas sold, cause the standing charges to increase. Therefore, it follows that all forms of business that can be secured from whatever quarter mean a reduction of the standing charges per unit of business done. There must be no acknowledged limitations to the scope of the gas industry in respect of economical gas supply, development of its own products and resources, and business expansion. The broader and stronger the business base, the greater the stability of the industry.

We are not among those who treat the new electrical proposals put forward by Departmental Committees as something the gas industry can afford to ignore; and the industry would be extremely foolish to let the proposals proceed without taking all possible precautionary measures (internal and external) to put itself in the strongest possible competitive position by any and every available process. The other day a writer in a German paper said that England was undergoing an "intellectual reconstruction." Probably there was contempt in the words; probably a little fear over the awakening in this country. Certainly there was a warning in them for the German people. How far this concerns the British gas industry in relation to the electrical industry's schemes, we will leave the men of the former to examine and determine for themselves. At the same time, be it remembered that the electrical schemes comprise, not only the promotion of greater generating economy, but the delegation to permanent Electricity Commissioners of legislative work, leaving the gas industry still to be dealt with by the cumbrous old parliamentary methods, and by tribunals the competence of which for the work is only assumed on the ground of political position, and not on that of a living intimacy with the subject upon which they will have to adjudicate. A permanent body of Electricity Commissioners (whose knowledge and predilection would expand) would be an advantage and a preference for the electricity industry, as would be the proposal for a Government subsidy or some other financial help. Any advantage or preference secured

by the electricity industry that the gas industry does not possess would be a disadvantage to the latter.

We hope for the gas industry a greater future than in the past. Of the opportunities for expansion, the industry must take its full share; and, to prove worthiness, it must show that its activities in promoting progress are not on the decline but are upward bound, and so are consistent with the times. This is why so much has been written in our columns regarding the appointment of a Special Committee by the President of the Board of Trade to investigate the potentiality of the gas industry for taking a larger place in future in the work of the country, and to ascertain the means necessary to develop its resources in the way best calculated to serve the national interests.

Officers and Staff War Bonuses.

A CORRESPONDENT, who cordially agrees with our article of last week on "Gas Managers' Salaries," makes a suggestion which we have pleasure in presenting to the administrators of gas undertakings as a basis upon which temporary increases of salary, owing to war conditions, might be paid to their officials and members of staffs receiving under £156, £500 and £1000 a year, although this does not touch the larger question of underpaid gas officials who are bearing the increased responsibilities of not only war but peace times. He suggests that the last awards made by the Conciliation and Arbitration Board for Government Employees should be adopted. Such a course should be of particular value to local authorities, who, able to refer to such awards as precedents for their action, would have in them strong support in dealing with opposition or criticism. What is necessary in the case of civil servants in respect of the abnormal conditions that have arisen from the war is equally necessary (if not more so) in the case of the officers and the staffs of local authorities or joint-stock companies. The first of the awards deals with employees whose ordinary remuneration does not exceed £3 a week, or £156 a year. In this case, the award is that the temporary increases of remuneration by way of war bonus shall be made up to the following weekly sums: Men of 21 years of age and upwards, 19s.; under 21 but not under 18 years of age, 15s.; under 18 years of age, 9s. 6d. As to the women, those of 18 years of age and upwards are to receive a total war bonus of 12s. 6d., while those under 18 years of age are to receive 9s. 6d. In the case of employees whose ordinary remuneration exceeds £3 a week (or £156 10s. a year), but does not exceed £500 a year, the Board have awarded over and above any temporary increases now being received: In the case of a man, £15 a year; but the total amount payable as war bonus is not to be less than £50 a year. In the case of a woman £10 a year; but the total amount payable as war bonus is not to be less than £33 a year. As to those officials whose ordinary remuneration exceeds £500, but does not exceed £1000 a year, the Board have awarded lump sum gratuities by way of war bonus, payable in part forthwith and in part on Jan. 1 next. This particular award is dated Aug. 2; and it provides that payment shall at once be made of an amount equal to 10 p.ct. of an officer's aggregate ordinary remuneration during the period from Jan. 1 to June 30 this year; so, however, that it shall not be more than £40. The payment to be made on Jan. 1 next is to be of an amount equal to 10 p.ct. of an officer's aggregate ordinary remuneration for the period July 1 to Dec. 31; so, however, that it shall not be more than £40 nor less than £32 10s. Any sums paid or payable by way of war bonus in respect of any period since Dec. 31, 1917, to those officers with ordinary remuneration exceeding £500 a year is to be taken into account and merged in the gratuities now awarded. In cases where the ordinary rate of remuneration of an officer for the whole or any part of the current year is above £1000, but under £1080 a year, a gratuity is to be paid to him, so as to make his total remuneration (including gratuity) during such time equal to that of an officer whose ordinary remuneration is £1000 per annum. The term "ordinary remuneration" is deemed to include allowances and the value of (if any) official quarters and all other emoluments, but to exclude overtime pay, and temporary increases of remuneration by way of war bonuses already granted or awarded. The amounts awarded are not to count for pension or gratuity under the Superannuation Acts, nor for the purpose of calculating rates of increment or overtime pay. Local authorities and companies owning gas undertakings ought surely not to be behind the Government in the consideration shown to officials and staffs in respect of additional war remuneration.

The Fuel Research Station at East Greenwich.

There will be gratification in the gas industry over the indications given in the third annual report of the Committee of the Privy Council for Scientific and Industrial Research, regarding the methodical and thorough manner in which the Fuel Research Board, under its Director (Sir George Beilby) are setting to work. It is intended that thoroughness shall dominate the research; and nothing of a makeshift order shall have part in it, as is often found in experimental plants connected with new inventions. This is quite proper. It is only in keeping with the far-reaching importance of the investigation that the Board have had confided to them, and the permanent influence and value of the issues. The gas industry is deeply concerned in the results being of a trustworthy kind, for its fundamental technical work depends largely upon it. In constructing the plant, there have been delays owing to the character of the East Greenwich site and the weight of the plant to be carried, besides which the well-known difficulties of the times have interposed themselves, and prevented any rapid progress. But it is now a satisfaction to learn that it is anticipated that actual work will be commenced at the station by the close of the year. The responsibility that attaches to the construction of the station is substantially attested by the fact that the first part of the buildings and equipment to be erected will cost about £120,000. The assistance that the South Metropolitan Gas Company have rendered to the Board in connection with the research station has been supplemented by placing at their disposal as Engineer the services of Mr. W. J. Burton; and he has been working in the matter of design in association with Sir George Beilby and Sir Frank Baines, of H.M. Office of Works. While the buildings are going up and the plant is being installed, Dr. Thomas Gray, Professor of Technical Chemistry at the Royal Technical College, Glasgow, is preparing his plans for the prosecution of the experimental work. Meantime, with the eye of Sir George upon the work, Prof. Bone is prosecuting at the Imperial College of Science, the investigation, referred to the Fuel Research Board by the Board of Trade, into the question of gas standards and composition. At the same time, close attention is being given to developments that are taking place in gas-works practice. Further details will be found in the extracts from the report in a later part of this issue.

Organized Research in Industry.

The Committee of the Privy Council give a prominent place in their report to the subject of organized research in industry and to the establishment of Research Associations, from which they hope large national benefit to issue through the information made available to the members of such Associations. There have evidently been difficulties arising from among manufacturers themselves in connection with the founding of the Associations; but the Committee of the Privy Council are truly anxious that the excellent scheme shall not suffer from any objection which can be validly raised, and which can be avoided. They cannot say more to clear away obstacles than is said in the report. There is no desire to yoke industries through the Associations to Government Departments. There is no wish on the part of any Government Department to exercise a governing influence; the members of each Association will be masters in their own associated research house. There is no compulsion upon an Association that can financially run alone to receive a subsidy from Government funds; and the members of an Association can reserve the benefit of their own discoveries for themselves. Another point is that arrangements are being made for the co-ordination of the work of the Research Department with that of the standing Joint Industrial Councils which are being established as a result of the Whitley report—an agreement having been made that the Department will consult the Industrial Council of an industry where one exists before setting up a Research Association for the industry. How will this affect the question of the non-disclosure of results to non-members of the Research Association? It is noted that the Committee of the Privy Council are exercising a judicious care in the handling of the fund of a million sterling entrusted to them by the Government for national behoof.

Oil and Temper in the Daily Press.

The low-temperature people are getting a bit out of temper with the Government over their oil policy; and it may be imagined that it is through the former that certain sections of the Daily

Press are taking an unprecedented interest in oil, about which they know as much as the man in the moon. The report of Lord Crewe's Committee, which has shown impracticability under existing circumstances, is the instrument that has brought the matter to a head; and so there is great clamouring now for an inquiry into the "failure" of the oil policy of the Government, and men of high reputation are being vaguely and indirectly attacked with a freedom that borders on the scurrilous. Allegations as to private interests overriding public interests are found among the litter exposed to the public gaze; and incompetence is something that the critics' eyes find running riot among the technical advisers of the Ministry of Munitions Mineral Oil Production Department. There is, according to Mr. Cunningham Craig, a "conspiracy of silence;" certain answers to questions given in the House of Commons were not permitted to appear in the Public Press; and the answers were grossly inaccurate and misleading, through the incorrect information given presumably by the technical advisers. The decision as to publication is completely in the hands of the Public Press; and there is no indication as to the way in which the answers were grossly inaccurate and misleading. Those who are making these random accusations should see to it that there is no flaw in the information in their possession, as they may themselves be pressed to substantiate them. The Government may be assumed to know better than these irate outsiders their own position as to oil. There is no mystery in them not embarking on great schemes at this stage of the war, which might after considerable expenditure of money, material, and labour (all of which are wanted for war purposes) bring forth something when the war has ended. The Government are going the right way to work in first making use of all existing resources, which do not absorb any extraordinary amount of time, money, material, or labour. Those behind the low-temperature schemes see that, however little they could contribute to war needs, if this opportunity is missed, they will be left to their unaided devices as before the war. This is the cause of all the hubbub, and nothing else.

Company Law Reform.

There are many interesting suggestions contained in the report of Lord Wrenbury's Committee, appointed in the early part of this year to inquire into what amendments are expedient in the Companies Acts, having regard to circumstances arising out of the war. Naturally, much attention is given to the question of alien control of British companies. With regard to companies owning British shipping, it is suggested that not more than 20 p.ct. of the share capital should be held by aliens, and that these shares should carry no more than 20 p.ct. of the voting power. A section deals with companies carrying on "key" industries—but without making it plain what undertakings exactly are referred to. This is a matter to be decided on occasion by the Board of Trade. However, when companies are held to be carrying on such an industry, the 20 p.ct. limit recommended in the case of merchant shipping should be made applicable. As to the titles of companies, the wrongful use of the word "British" has evidently been before the Committee, who think that there should be some machinery for controlling the name employed, so that a representation of nationality where the company is not British shall, as far as possible, be prevented. It is advocated that, under certain restrictions, the issue of shares at a discount should be permitted; and also that companies should be granted the power of making an assessment on their shares, in order to avoid re-construction. It is thought that the law as to reduction of capital, and as to payment of dividends out of capital, should be maintained as at present. A point raised from time to time that is dealt with in the report is the payment of directors' fees free of income-tax. As to this, the Committee say: "We have learned that there exists a practice in some companies of making the payments to directors, *quâ* directors, free of income-tax, including super-tax. Assume that a director's fees are to be £100 a year free of income-tax and super-tax. The additional sum which he, in fact, is paid by reason of his being relieved of income-tax is a sum not fixed, but varying according to what his aggregate income from all sources may be. The shareholders ought to know what the directors' remuneration is. We recommend that payment to directors free of income-tax or of super-tax shall be forbidden." Another point referred to by the Committee is the concealing, in the Memorandum of Association, of the "objects" of a company by introducing endless "powers;" and suggestions are made by which the Memorandum would be reduced to its proper function in defining the trade of the company or object which it is to pursue with a view to earning profit.

PERSONAL.

Mr. JAMES WOODS, of Clones, co. Monaghan, has been appointed Manager of the Ballibay Gas-Works, in succession to Mr. PATRICK O'BRIEN, who has transferred to the Navan (co. Meath) Gas-Works.

The position of Manager at the Barnard Castle Gas-Works has been filled by the appointment of Mr. JOHN SHIELD, of Stockbridge—formerly of the Chester-le-Street (Durham) and the Hexham Gas-Works.

Mr. CHARLES H. LANE, at present Assistant Engineer and Manager of the Bath Gas Light and Coke Company, has been appointed Engineer and Manager of the Weymouth Consumers' Gas Company, in succession to Mr. T. F. CANNING, who will be shortly leaving for Southend. There were 78 applicants for the post.

After almost fifty-four years' service, Mr. HARRY WILKINSON, the Secretary and General Manager of the Harrogate Gas Company, has retired. His retirement has involved re-arrangements of the staff. Mr. FRANK H. ROBINSON, Assoc.M.Inst.C.E., the present Engineer, becomes Engineer and Manager, and Mr. ARTHUR I. SEATON, the Assistant Secretary, becomes Secretary of the Company.

The position of Engineer, Manager, and Secretary to the Richmond (Surrey) Gas Company—rendered vacant by the death of Mr. Thomas May—has now, we understand, been filled by the appointment, from among a very large number of applicants, of Mr. E. GEORGE HUTCHINSON, the Gas Engineer and Manager to the Carlisle Corporation. Mr. Hutchinson has been at Carlisle since 1913, when he went there from Workington, to succeed Mr. H. E. Bloor, on his removal to York.

Mr. T. CARMICHAEL, who has during the last four years occupied the position of Superintendent at Basford Gas-Works of the Nottingham Corporation, has been presented by members of the staff and employees at the station with a handsome canteen and silver cigarette case, upon his leaving to take up the post of Assistant Engineer to the Portsea Island Gas Company. The presentation was made by Mr. John Wilkinson (the City Gas Engineer). Mr. A. Hayday (the Secretary of the District Branch of the General Workers' Union) spoke of the high esteem in which Mr. Carmichael was held among the employees.

Mr. WILLIAM LOVATT, the Chief Clerk of the British Gaslight Company at Hull, has completed fifty years' service with the Company. To mark the occasion, the Engineer and Manager (Mr. John Young) entertained Mr. and Mrs. Lovatt and the officials to a war-time dinner, at the Royal Station Hotel, and presented Mr. Lovatt with a silver salver, tea service, and a cheque for £100 from the Directors. Mr. Young expressed the regret of the Chairman and Secretary of the Company at their inability to be present, but said they appreciated, as he did, the excellent and faithful manner in which Mr. Lovatt had carried out his duties. Mr. Lovatt acknowledged the gifts, and spoke of the unvarying kindness he had received from the Directors. He also thanked the staff for their loyal support. Earlier in the day, the officials had presented Mr. Lovatt with a case of silver peppers and salts, and a pair of silver candlesticks.

Obituary.

The funeral took place on Friday, with military honours, of Colonel BERTRAM HOPKINSON, C.M.G., F.R.S., Professor of Mechanism and Applied Mechanics at Cambridge, who was killed in a flying accident near London. Prof. Hopkinson was known to "JOURNAL" readers in connection with his researches on internal combustion engines.

Certain large firms have combined to offer to the governing body of the Manchester College of Technology the sum of £3000, spread over a period of five years, towards the cost of establishing a new department of industrial management; and this has been accepted by the City Council. A lecturer will be appointed for five years, at a salary of £600, to conduct research in the subject of industrial management, to organize a new department, to lecture to members of the college and to the public, and to assist industrial concerns in the solution of management problems.

There is notified in the "London Gazette" the appointment of a Commission to "consider and report whether it is advisable to make any changes in the denominations of the currency and money account of the United Kingdom, with a view to placing them on a decimal basis, and whether, if an alteration of the present system is recommended, it is desirable to adopt, with or without modification, the proposals embodied in the Bill recently introduced in the House of Lords by Lord Southwark, or some other scheme; and in the latter alternative to make specific recommendations for consideration by Parliament."

SCIENTIFIC AND INDUSTRIAL RESEARCH.

Third Annual Report of the Committee of the Privy Council.

THERE has just been published the third annual report of the Research Department established by the Government for the purpose of encouraging research and of assisting the scientific investigation of industrial problems.

The Committee summarize the year's expenditure, and the more important questions of policy involved. The past year has, they say, seen a great extension of the work of the Department. They have approved the comprehensive scheme of research and the proposals for the erection of a National Fuel Research Station submitted by the Fuel Research Board. The station is being erected at East Greenwich, and will, it is hoped, begin work by the close of this year. The Director of Fuel Research (Sir George Beilby) is responsible for the lay-out and equipment of the site and works. The buildings and equipment to be first erected are estimated to cost about £120,000; while the land, which has been leased to the Government at a nominal rent by the South Metropolitan Gas Company, is amply sufficient for any likely development. The Director has also placed his unrivalled knowledge and experience at the disposal of the Government in connection with many aspects of the fuel problem. Further details of this work are given in the report of the Advisory Council, which is appended to the Committee's report.

It is pointed out that it is open to an industry to establish an approved Association without seeking assistance from parliamentary funds; and Associations of this kind will have exactly the same privileges, and will receive the same assistance in the way of advice and information, as Associations receiving grant. The intention is that the Associations shall manage their own affairs and benefit by their own discoveries. The Committee believe that the Department can help each by keeping it in touch with the work of the rest; that the limitation of Government grants, in all ordinary cases, to a short period of years, and the provision under which an Association can either forego grants altogether or abandon them at any time, are evidences of their intention. The power of the Department to interfere in cases in which the national interest is concerned, or in which the funds provided by Parliament are not being used for the purposes for which they were granted, is the minimum safeguard that a democratic country could require. But if the firms in an industry will undertake research either for themselves or in combination on another plan which they think will be better suited to their needs, they will as certainly receive the sympathetic consideration of the Department, and such assistance as is in its power to render. The Committee have never thought that the Industrial Research Association would meet the case of all industries; but the receipt of public funds must entail the performance of public duties, for which the Department must have a care.

REPORT OF THE ADVISORY COUNCIL.

The first part of the report of the Advisory Council deals mainly with the progress which is being made in the establishment of Research Associations by industries which are preparing to undertake co-operative scientific research for the benefit of members of the Association. The movement towards the formation of Research Associations is stated to be very encouraging. There is abundant evidence of the increasing realization of the need for organized research in connection with industry. Arrangements have been made for the co-ordination of the work of the Research Department with that of the Standing Joint Industrial Councils which are being established as a result of the Whitley report. In the year under review, the Department have become responsible for the maintenance of the National Physical Laboratory. Among other matters, they are finding, through their grant to the Institution of Gas Engineers, one-half of the cost of the researches into refractories which are being conducted at Stoke-on-Trent; while certain other researches on the same subject are being conducted at the National Physical Laboratory. "In this way," the Council remark, "quiet progress is assured, pending the development of a larger scheme."

THE FUEL RESEARCH BOARD.

On the subject of the Fuel Research Board, the Advisory Council say:

In the report for 1916-17 reference was made to the first report of the Fuel Research Board, and to the general policy of research which was there outlined. Soon after the presentation of that report, the Fuel Research Board issued a second report on "A Scheme of Research and the Establishment of a Fuel Research Station."* In this report, which was presented in September and published shortly after, the policy outlined in the first report [this report was not published] was developed and elaborated. The scheme was approved by the Lord President; and the Director, with the assistance of Mr. W. J. Burton, whose services have been placed at the disposal of the Fuel Research Board by the South Metropolitan Gas Company, as Engineer, proceeded with the preparation of the plans for the research station. By October 5, 1917, the plans were so far completed that it was possible to present a preliminary estimate for the cost of its erection; and by arrangement with H.M. Office of Works, Sir Frank Baines, one of their principal Architects, took over the actual work of erection. The necessary alterations in the railway approaches to the station were begun in March, 1918, and are now nearly complete.

As the buildings and other erections involve the carrying of considerable weight on the foundations, the architect decided that it was necessary to put down trial bores all over the site. This involved considerable delay, and the actual excavation and laying of the foundations was only begun on March 20. Meantime, the contracts for the steel structural work had been placed, and much of this material was ready for erection as soon as the foundations were prepared. The buildings are now making rapid progress.

The Director and his Engineer are still closely engaged in the designing of the plant and apparatus for the station, and contracts for certain items have already been placed. But much still remains to be done. The scarcity of skilled labour and of materials has greatly increased the delay; but the Director of Fuel Research desires to record his appreciation of the helpful enthusiasm of Sir Frank Baines and his staff, which has resulted in the successful carrying on of the work, in spite of all the difficulties and disadvantages of the time.

In preparation for the experimental work, which will be started at Greenwich directly the buildings are finished, the Lord President, on the advice of the Director of Fuel Research, has appointed Dr. Thomas Gray, Professor of Technical Chemistry at the Royal Technical College, Glasgow, to be Superintendent of the Laboratories at the Fuel Research Station. The Governors of the College have in a most public spirited way seconded Prof. Gray, with the concurrence of the Scotch Education Department, for this important service during the period of the war; and he is already engaged planning the lay-out and equipment of the laboratories, in consultation with the Director.

THE PEAT INQUIRY COMMITTEE.

The Irish Peat Inquiry Committee, which was appointed last year, recently presented a report which was considered by the Fuel Research Board and subsequently discussed at a conference held in London between the Committee and the Board in June of this year. As the result of the conference, the Committee have now presented a supplementary report which is under the consideration of the Board. The Board will in due course submit to the Committee of Council their views upon this important and difficult question.

OTHER WORK OF THE FUEL RESEARCH BOARD.

In accordance with the declared policy of the Department "to place its knowledge and the results of its investigations at the disposal of others" in all cases where the national interests allow, the Director of Fuel Research has continued during the past year to give advice to the Admiralty and Ministry of Munitions in connection with urgent war problems, and in particular has been acting as an expert adviser to Lord Crewe's Committee on the Production of Fuel Oil from Home Sources.

The Lord President has promised that the Director of the Fuel Research Board shall give assistance to the Committee under the chairmanship of Lord Harcourt recently appointed by Mr. Walter Long "to inquire into, and advise as to, the policy which His Majesty's Government should follow to secure supplies of oil for naval, military, and industrial purposes." The Director is also supervising the experimental work which has been found necessary in order to obtain data on which to advise the Board of Trade on the technical question of gas standards, which was referred by that Department to the Fuel Research Board. This work is being carried out at the Imperial College of Science and Technology under Professor Bone. In this connection the Board is following with close attention the developments now taking place in gas-works practice.

The Fuel Research Board have followed with interest during the past year the growing use of coal dust firing for steam boilers and furnaces; and they have appointed a representative to make inquiries on this subject in the United States of America, and report to them.

The Department, on the advice of the Board, have continued their grants to the Meteorological Office for the work on atmospheric pollution. The Advisory Committee to that office have been enabled to experiment with certain modifications in their methods of recording pollution. Grants have also been continued with the approval of the Fuel Research Board to the Institution of Mining Engineers for their investigations into the atmospheric conditions in deep and hot mines. But as soon as the National Coal Mining Research Association is established, we anticipate that it will become directly responsible for these researches so far as the getting of coal is concerned.

The members of the Fuel Research Board are, it may be recalled, Sir George T. Beilby, F.R.S. (Director), the Hon. Sir Charles A. Parsons, K.C.B., F.R.S., Sir Richard Redmayne, K.C.B., and Sir Richard Threlfall, K.B.E., F.R.S. The Acting Secretary is Mr. R. W. Stanners. Communications should be addressed to the Director of Fuel Research, No. 15, Great George Street, S.W. 1.

The report concludes by describing the method of awarding grants to students and research workers.

See "JOURNAL," Vol. CXL., p. 128.

Reconstruction Problems.—The Ministry of Reconstruction are issuing pamphlets dealing with reconstruction problems. No. 1 describes the "Aims of Reconstruction;" and No. 2 deals with "Housing in England and Wales." These are only the first of a series. The pamphlets are neat productions; and the price is only 2d. each, which, if ordered through the post, would, we take it, have to be supplemented by the postage.

Wages of Women.—The Government have decided to appoint a Committee "to investigate and report as to the relations which should be maintained between the wages of women and men, having regard to the interests of both, as well as to the value of their work. The recommendations should have in view the necessity of output during the war, and the progress and well-being of industry in the future." The Hon. Mr. Justice Atkin is to be Chairman of the Committee.

ELECTRICITY SUPPLY MEMORANDA.

When the war started, the electricity supply industry largely adopted the method of increasing charges to consumers by the application of a war cost based on a percentage of the account.

Percentage Increases and Post-War Charges.

The undertakings have, with advancing costs, pursued the same method, until now there are concerns with percentage additions amounting to even as much as 40 to 50 p.ct. of the pre-war rate of charge; and goodness only knows whether, with the grab-all-you-can policy of coalminers and some other classes of labour, and rampant profiteering in so many branches of industry and trade, the top mark of the percentage addition has yet been reached. One advantage, of course, of the system of percentage additions is that it keeps before consumers the cost at which they were getting current before the war, and the amount that they are paying extra due to the cost impositions of the war. But will there not be a disadvantage later on? When the war is over, with the war costs charged separately, consumers who do not know better, will be looking for a speedy liquidation of the percentage, and will be disappointed. From all appearances, the reduction of the percentage will be a somewhat long and tedious process; for it can be said with a very fair amount of assurance that costs of materials and labour, taxation, and so forth, are not going to return to their old pre-war levels. The miners, for instance, and certain other classes of labour, have had war increases merged into their ordinary wages; and nowhere can it be expected that the full sum of wage war advances will be relinquished. If any attempt is made in this direction, there will be a tremendous labour upheaval. One result of a continuation of a part of the increased costs of labour will be that industrial costs everywhere will be heavier; and so will be capital and upkeep charges, through the higher costs of production of plant and appliances. Supplementing this will be dearer money. Consequently, there must be a part of the war percentage charge for electricity that will be permanent, and will have to be merged in the pre-war rates. A percentage war increase cannot go on indefinitely. When this comes about, will the lighting consumer continue to be the pack horse, or will the electricity industry do the right thing, and make a proportionate increase on all branches of its business? We have not seen any indication as to what will be electrical policy in this respect. In the case of the gas industry, the method of war increase has been the simple one of raising the old charges, so that consumers know precisely what they have to pay per 1000 c.ft. or (in some cases now) per 100 c.ft. These charges will only be reduced as circumstances allow.

Rationing an Education in Economy.

The "Electrical Correspondent" of the "Times Engineering Supplement" sees a bright side to rationing, whatever its character; and we concur. It undoubtedly has made people think about production and distribution, which is perhaps a great blessing; and compelled economy is a good introduction to the study of economics. Some lasting benefit ought to accrue from this, though there will be a debit side to it from those people who, once they are released from control, will give full vent to their newly-acquired liberty, and go from enforced moderation to unbridled excess. But in the case of gas and electricity where the lessons of the present time abide, they will have good commercial effects; for in both businesses economy is a factor of no mean importance to expansion of trade. Economy in connection with gas has a big margin supplied by the extravagance which ease of use and relative cheapness (in comparison with electricity, and for the matter of that with coal, too, in some places, taking convenience, time savings, and up-keep economies into account) had before the war tended to promote. With electricity there is not the same room for economy. As a heating agent, it is most expensive; and in its use the same latitude is not given for economy as in the case of gas through having fixed points of consumption.

Electricity as a Transmitter of Heat Energy.

Part of the stock-in-trade of electrical writers appears to be an amount of bluff, which they deal out with more or less freedom to the technically uninstructed. The "Electrical Correspondent" of the "Times Engineering Supplement" occasionally indulges in this form of (shall we call it?) playfulness. Here is an example: "Probably few people [this is in the same article as the one referred to in the preceding paragraph] have given themselves the trouble to understand that electricity in its domestic and industrial meaning is simply a convenient and clean method of transmitting the energy that is imprisoned in lumps of coal." Probably this is true; but those who had given any consideration to the matter must have come to the conclusion that, from the thermal point point of view, electricity as a transmitter of energy does its work very badly. "The energy that is imprisoned in lumps of coal." Of course, it does not transmit "the "energy. The heat energy of a ton of coal is represented by some 30 million B.Th.U., and the average B.Th.U. delivered by electricity at the consumers' terminals, taking the average consumption of coal per unit by the generating stations throughout the whole country, and including the losses *en route*, is less than 2 million B.Th.U. per ton of coal. Therefore, electricity as a transmitter of energy does its work in a very inefficient way, as it omits to deliver some 94 p.ct. of the heat energy of the coal, and does not give a satisfactory account of its omission. But the "Electrical Correspondent" thinks that, whenever the thought conveyed by his words takes firm root in the minds of any person of average intelligence, it must raise a sound prejudice against the needless carting of millions of tons of black fuel as a practice of barbarism, seeing that light, heat, and power can be delivered by wire and pipe. When the foregoing figures are considered, and the person of "average intelligence" gets firmly implanted in his mind that electricity transmits to him only 6 p.ct. of the heat energy in the coal, he will rather doubt the appropriateness of the word "wire." The reference to "pipe" without any allusion to gas in the immediately preceding sentences of the article will be rather vague to persons below "average intelligence," though fortunately it may be taken that few such read "The Times Engineering Supplement." Anyway, if the figures we have put forward are brought before householders, they will be better able to interpret the succeeding statement: "When the Board of Trade tell the dwellers in the suburbs that they must choose to be supplied either through sacks, pipes, or wires, and that the ultimate source is the same, it is to be hoped that this question will not be examined by them as merely touching their household profit and loss account."

Public Backing for Electricity.

There is another point of interest to gas men in the same article which requires watching in order that sound knowledge and not deception may obtain public credence. The "Electrical Correspondent" is anxious that the report on electric power supply should be better known and understood in its broad and simple significance by all responsible citizens; for he sees a disposition to regard it as just so much matter for bargaining and compromising as between different classes of vested interests and Government Departments. He also anticipates that the rather astonishing unanimity of the Board of Trade Committee will be broken into when legislation is promoted; and therefore he is anxious to get the backing of the public, by making them understand that what is being promoted is to ensure the more economical use of fuel and more copious distribution of light, heat, and power. If this is the object, then the "Electrical Correspondent" has overlooked the claims of the carbonization of coal, with its provision of gas, coke, and countless other secondary products required by industries, agriculture, and the community generally, as being a more economical use of fuel. He cannot deny these claims; and there can be no compromise with a system that does its work less efficiently. He says: "The country must get more value out of its precious stores of coal." The point therefore is which is relatively the superior system of bringing into the national account the higher value. But he does not appear anxious for the public to look at the matter from this point of view. The gas industry is anxious that the public should. He is also solicitous about the hurrying on of the scheme of the Electric Power Supply Committee. "The whole scheme," he writes, "is planned for getting more out of the nation's coal; and the after-war situation is surely serious enough to warrant some impatience with minor amendments." It is because of similar considerations that there is a desire on our part to have set-up by the President of the Board of Trade a Committee competent to look into the position of the gas industry in relation to these matters, and as they affect national interests.

The Deficiencies of the Boiling-Plate.

While electrical writers and preachers are keenly spreading intelligence as to the extraordinary value of electric-ovens as savers of meat shrinkage by the simple process of running them at a lower temperature than their competitors, little is said as to the poor efficiency of the boiling-plates. Seeing, however, that so much work is required in the boiling line in culinary operations, the low efficiency, combined with the heavy price of B.Th.U. electrically developed, is rather disastrous to the other claims of the electricians. The writer of "Cooking and Heating Notes" in the "Electrical Times" makes a confession. The efficiency of electric boiling-plates, he says, is "miserably low." Present-day boiling units of the surface-heating type show little advance in respect of efficiency upon those available in the early days of the industry. He holds out little hope. He admits that there seems small prospect of any material improvement being effected in this direction; for he finds it difficult to see how with a vessel merely placed over a source of heat, waste of energy can be eliminated. The open-type plate, from the surfaces of which heat is radiated, does not show a much higher efficiency than the enclosed form. To minimize waste, close thermal contact is essential between the surface of the plate itself and that of the vessel being heated. This involves the machining of both surfaces; and even then the efficiency is but poor. When the surfaces are machined, good contact for any length of time is prevented, owing to dirt or warping. Then there is the high cost of the utensils with machined bases. These have to be of cast metal; and, owing to the amount of heat the thick metal absorbs before useful work is done, domestic users prefer sheet metal vessels. With these, as soon as the base becomes dented or bulges, the bottom only touches the plate at points, with the certain result that there is loss of efficiency and so slow work. The enclosed plate gives no ocular indication of when it is in circuit; and this

also results in waste. On the whole, the writer can only see the realization of higher boiling efficiencies by the use of self-contained utensils with the elements bolted direct to the base or immersed in the liquid. With immersion heaters, he claims that the efficiency may approach 95 p.ct.; with elements bolted to the base, the figure may reach 80 p.ct. These figures—especially the 95 p.ct.—are generous when one considers the question of continuous radiation from the casing of the vessel itself; and the longer the work has to continue to get good cooking results, the greater the loss. Besides, if the vessels are to be heavily lagged for domestic purposes, they will be clumsy things. The cost of such self-contained vessels is also considerable; and for kitchen use the number and sizes of utensils required would make the expense prohibitive. Each vessel, too, would want its length of flexible wire, and appropriate plug socket. No wonder the writer in our contemporary has to say that improvement in boiling-plate efficiencies is very desirable, has to urge that these should be striven for by every maker, has to agree that the position is anything but satisfactory, while finding a little pleasure in encouraging the belief that the position is worse than it need be. Strange if this be so after all the endeavour of the makers. Why does not this writer instruct the makers as to the way of improvement? We see, by-the-bye, that, in the division of "Physics" of the annual report of the National Physical Laboratory, it is said that there has been collaboration with the Heating and Cooking Panel of the Engineering Standards Committee in the development of efficiency tests for electrical plates and cooking-stoves, and that a considerable amount of work has been carried out in connection with the subject. But curiously there is no statement as to the results. Cannot these be published?

Coal Resources of the British Isles and Germany.

Prof. H. Louis, speaking at the Scientific Products Exhibition, said that much capital had recently been made out of the fact that the coal resources of Germany were two and a quarter times as great as those of the British Isles. But we were awakening to the fact that the resources of the Empire could be, and ought to be, pooled for the benefit of the whole Empire. Add the coalfields of South Africa, Canada, India, and Australia to those of the British Isles, and we should get total resources considerably more than three times those of Germany and her Allies. Of far more immediate importance was the question of the actual coal production. Of the estimated coal resources of Germany, about three-fourths were returned as only probable, and only one-fourth as actually proved; whereas of the British coal reserves, two-thirds were actually proved. Output was the thing that mattered for the moment; and the output of the British Isles was still greater than that of all Germany.

The M'Laurin Patent Scrubber.

The M'Laurin patent centrifugal gas-scrubber, which is manufactured by Messrs. Blair, Campbell, and M'Lean, Ltd., of Philadelphia, is the subject of an illustrated article in the Chicago "Gas Record." It consists of a cast-iron cylinder, with a vertical shaft extending from top to bottom, driven from below. The space within the cylinder is divided by a series of shelves, slightly conical towards the centre, where in each one there is a rather large opening. These openings are directly over cast-iron cylinders, with solid bottoms, mounted on the vertical shaft. The walls of the cylinders are perforated with openings; and in each of these openings is a brush. The gas to be scrubbed enters near the bottom, and, working its way upward, passes out at the top. The inlet for the scrubbing liquid is at the top of the machine, and the outlet at the bottom. The rising gas meets the down-coming liquid, which, falling on the top of the conical pan, and dropping through the holes in it, passes into the uppermost rotating cylinder, where the centrifugal force throws it out through the holes into which the brushes are inserted. Then the liquid, finding its way very rapidly along each fibre of the brushes, is immediately whipped into a fine spray or mist. This mist is disseminated through the entire space; so that the gas, in passing through, is brought into complete contact with the particles of spray. The liquid is immediately gathered up on the pan below, and falls again to the next rotating cylinder, where the process of atomizing and spraying violently throughout the area is repeated. This process is gone through as many times as may be necessary for the special problem in hand. The diameter of the cylinder and its height are governed by the work to be done. In an illustration given by our contemporary the machine has a division in the centre, above which the benzol, and below which the ammoniacal liquor, is recovered.

North of England Gas Managers' Association.—On this occasion, the autumn meeting of the Association is to be held in Newcastle on Sept. 21, instead of, as usual, on the first Saturday in October. The principal item of business will be the Presidential Address of Mr. Norman S. Cox, of Sunderland. The programme will also include a discussion on the Household Fuel and Lighting Order, 1918, to be introduced by Mr. H. E. Bloor, of York. The alteration in the date of meeting is owing to the contemplated changes in the train service.

NATIONAL KITCHEN HANDBOOK

Gas v. Electricity.

We have received from the National Kitchens Division of the Ministry of Food a copy of the official "Handbook of National Kitchens and Restaurants." It is a book worth having by those who are interested—and all gas men should be—in this new movement; and copies may be obtained, free of charge, from the offices of the National Kitchens Division, at 4, St. Paul's Churchyard, E.C. The Director (Alderman Chas. F. Spencer) is very anxious for the "Handbook" to be the means of stimulating the establishing of such kitchens and restaurants by local authorities. This anxiety is shared by both the Food Controller and the Coal Controller—the latter in view of the coal shortage and the difficulty that will be experienced during the coming winter of providing hot meals for all classes. The power of human penetration as to coming conditions is in these times vastly reduced by the very uncertain nature and dimensions of our future circumstances, even those that are proximate. Therefore, the Controllers are of opinion that the extension of National Kitchens through the country would be not only of immediate value, but of material assistance in meeting any situation that may arise. The central authorities have done all possible to make the way easy for the establishment of National Kitchens. The Local Government Board and the Scottish Office have issued Orders conferring on local authorities the powers necessary to provide for the due discharge of any functions assigned to them by any Order made by the Food Controller under the Defence of the Realm Regulations. On their part, the Ministry of Food will lend the capital sum free of interest (the same to be repaid in ten equal annual instalments) to any local authority desirous of setting-up National Kitchens or Restaurants.

It is clear from what is said in the "Handbook" that a tremendous mess can be made of a National Kitchen—financially and otherwise—unless there is close study of every condition in establishing, equipping, staffing, supervising, and so on. With due attention to these points, providing local conditions and patronage are favourable, a National Kitchen should be self-supporting. Direction is found on all of these matters; and in respect of them—save one upon which we shall have to pass a little criticism—the advice is founded upon experience, which experience includes failure. Among other things, it is seen that it is preferable to limit the capacity of a National Kitchen; and, when once a certain capacity has been reached, to make extension by organizing another kitchen in a neighbouring locality. There are several reasons for this. Where great weights of food have to be handled, a number of employees would be required solely for the purpose of loading and unloading. Again, cooking in large quantities for the purpose of realizing cheapness can never be so attractive as when attention can be paid to small dishes, which is a point against National Kitchens and in favour of domestic catering and cooking. Many of the pleasantest foods it is impossible to prepare in great bulk. From quantity cooking, one gets a sense of monotony, through the absence of variety. Furthermore, by limiting the capacity of kitchens, and establishing new ones consistent with the requirements of the neighbourhood, a new source of custom is tapped, which probably would not be the case to the same extent by the mere extension of the kitchen already in existence. It seems pretty conclusive now that the distribution of food from central kitchens adds too greatly to the expense to make it a proposition that can be commended.

An important part of the "Handbook" is the schedule of equipment; and in this connection it must be acknowledged that there has been some attempt to trim the advice so as to show an impartiality as between the various "fuel" claimants. Steam is advocated for cooking vegetables and puddings; and, where there is no central steam supply, automatic steamers, with gas as the generating agent, are recommended. But we read:

> At present the last word can hardly have been said on electric cooking. If supplied for not more than 1d. a unit, it is a very satisfactory agent for roasting, as the loss of meat in weight is less, basting is less frequently required, and a pleasant nutty flavour is given to the joint. The cost of current, however, becomes excessive unless careful attention is given to turning-off switches to low, medium, and high, according to the directions given. An electric-griller, when wanted for only a few minutes at a time, is very convenient; and an electric deep fryer is also recommended. Heating water or soup by electricity in kettles or stockpots is slow and expensive, unless the utensils are specially constructed for the purpose. Whenever electricity cannot be supplied for 1d. or less per unit, it will be found better to use gas, if it can be obtained at not more than 3s. per 1000 c.ft.

Even at the prices named, it would be found better to use gas. This "Handbook," we have pointed out, is based on growing experience. It is abundantly clear from it that all boiling or steam-raising operations are expensive with electricity. Whatever the cooking purpose, electricity must be expensive, because of its lowness in thermal value per unit. Even when an electric-griller is employed, it is only spoken of as "convenient" if wanted for a few minutes at a time. From the quoted remarks, it is pretty clear that the view of the writer of the "Handbook" is that the use of electricity should be confined to roasting, and then only if supplied at not more than 1d. per unit. This is "damning with faint praise." But on what grounds is even this faint praise given. The first is that the loss of meat is less. We should like

the Kitchen Division of the Ministry of Food to explain to us how—assuming that equal temperatures are used in an electric and a gas oven—there can be any difference in the weight of two joints that are equal in their original weight and constitution. It would also be interesting to know why, cooking at equal temperatures, more basting should be required in the one case than the other. And further, why temperature derived electrically should, by some mysterious means, impart a "nutty" flavour to joints as compared with temperature derived by some other means. This is perhaps a question for the physiologists; for it is about as mysterious as any of the extraordinary and humorous claims that have been made for electricity used in an oven. Perhaps in time the electricians will find a means of imparting other flavours to joints, so as to suit all palates. It will be remarked, too, that in these kitchens "careful attention" has to be bestowed upon the switches, to avoid excessive cost, which means increased supervision. But nothing whatever is said in the "Handbook" as to the higher capital, installation, and maintenance costs for electricity compared with gas; and sufficient emphasis is not laid on the need for specially constructed and costly utensils in order to get the highest possible efficiency from an agent that is expensive for the thermal value supplied. The best all-round labour saving medium is gas; while for the heating of water in bulk gas coke is hard to beat for moderate cost, as some of these kitchens have demonstrated.

However, the "Handbook" should be obtained by every local authority and by every gas manager and salesman, whose business it is to see that the range of efficiency which gas possesses has due recognition, and that deception is not allowed to displace its claims without fair exposure.

Carbonizing Lignite under Pressure.

Carbonizing lignite in the way in which bituminous coal is ordinarily retorted results in a gas of low calorific value, and very unsatisfactory distillates; and experimental work has been undertaken by Prof. F. Schoch, at the University of Texas, with the object of obtaining more desirable products from the treatment of this substance. The lines that have been followed in the investigation have been explained by him in a paper presented at the annual meeting of the South Western Electrical and Gas Association. Starting from the point that, in the formation of hydrocarbons in the retorting of coal or lignite, pressure is one of the first factors to be considered and controlled, he states that the carbonizing of lignite under a pressure of seven atmospheres gives a gas of a calorific value of 740 B.Th.U.; while under a pressure of one atmosphere the gas yield is of only 350 B.Th.U. Another factor that affects the formation of hydrocarbons in the retorting of coal or lignites is the relation between the time required for the reaction and the rate at which each portion of coal is heated in the retort. A third consideration is the passage of gaseous products through hot layers of coal of different composition from the layers in which they were formed. The systematic application of one or another of these influences should certainly enable us to change lignite deliberately (by retorting it) into desired products; but the difficulty at present is the lack of definite knowledge concerning the effects of these various factors. Hence the first step in the solution of the problem consists in the determination of the effects due to these separate influences.

Tar Oil for Metallurgical Purposes.

There has been published in "Engineering" the substance of a paper read by M. A. Gouvy before the Congrés du Génie Civil in Paris, during the early part of this year, on the subject of bye-product recovery in iron and steel works. Having ascertained while in Russia the great advantages derived from the use of naphtha in metallurgical furnaces, M. Gouvy perceived the interest which would attend the development in France of the use of heavy oils obtained from the distillation of tar, which have a great analogy to naphtha. The question of the heavy oils was, he points out, taken up in Germany as early as 1910; and following an active propaganda, the coke-ovens were made to yield 1,000,000 tons of tar in 1911, from which 300,000 tons of heavy oil were extracted. This oil is fluid at + 15° C. On cooling-down to freezing-point, a deposit of naphthalene is formed, which is re-dissolved when heated by means of a coil. The specific gravity of the oil is from 1 to 1·1; and its calorific value about 16,000 B.Th.U. per pound and above, according to the hydrocarbons (naphthalene) it contains. The percentage of sulphur is only from 0·3 to 0·5, and rarely reaches 0·7. The flash-point is between 65° and 90° C.; and the oil burns without leaving any residues. Tar oil is used in Diesel engines, in which the consumption is less than ½ lb. per horse-power-hour; and M. Gouvy is convinced that it can take the place of coal in many instances for the heating of open-hearth and other furnaces, in which a regular temperature and a neutral atmosphere are required. The advantages of tar-oil are identical with those of naphtha, and are stated as follows in comparison with coal: Reduction in tonnage transported owing to greater efficiency; almost total absence of waste during transport and transhipment, when full facilities are available; maximum utilization of the fuel, absence of clinkering and no stoppages; easy and accurate regulation of temperature by the simple action of valves; minimum oxidation of all metallic surfaces subject to the heat, and purity of the flame; higher and more regular temperatures than are obtainable with coal; and greater simplicity of the furnaces using oil fuel, with absence of chimney and flues.

SILICA REFRACTORY BRICKS.

French Research on the Causes of Superiority.

Experiments by MM. H. Le Chatelier and B. Bogitch, described in a recent communication to the French Academy of Sciences, have served to throw some light on the cause of the highly refractory quality of silica bricks, and to provide physical and chemical data characterizing such bricks which exhibit satisfactory performance in regenerative furnaces adopted in steel making or for the heating of gas-retorts.

Clay bricks, according to the authors' measurements, begin to soften between 1300° and 1400° C., and cannot then bear a substantial strain without giving steadily though irregularity. As the temperature increases, they behave as a vitreous material—*i.e.*, as one without a sharp melting point, but becoming fusible over an extended range of temperature. The so-called melting point of pure kaolinite, taken as 1780° C. and identical with that of quartz, when determined by the use of Seger discs, actually represents the rapid sinking of the material under a pressure equal to the weight of the test-piece, and thus of the order of 1 gram per sq. cm. A pressure ten thousand times greater—*i.e.*, 10 kilos per sq. cm.—causes the sinking of the kaolin to take place with the same speed at a temperature 400° C. lower.

In explanation of the different behaviour of clay and quartz, it may be assumed that the latter possesses a sharp melting point, without previous softening, and therefore independent of pressure. The authors' experiments have fully confirmed this assumption. On pressing a small cylinder of clay at about 1500° C., it is seen to take the form of a barrel, and then to flatten out into a small round plate with rough edges without showing actual rupture at any instant. On cooling, the pressed material is found to have kept all its original hardness. With silica, on the other hand, the pressure produces no appreciable effect at the outset; but on further application the test-piece is seen to break suddenly, exhibiting the two cones which are noticed in the fracture of all hard materials by pressure. The broken fragments do not unite in any way as the test-piece cools down. The force required to produce this sharp fracture is found to increase with the temperature at which the test is carried out, as shown in the following results obtained with a good American silica brick sold as the "Star." In the table the resistances to compression are expressed in kilos. per sq. cm.

TABLE I.

Temperature. ° C.	Resistance. Kilos. Per Sq. C.m.	Temperature. ° C.	Resistance. Kilos. Per Sq. C.m.
15	170	1200	85
520	158	1320	62
670	150	1460	50
800	139	1540	37
950	125	1600	30
1050	120	..	..

These numbers, by calculation, indicate a resistance of 12 kilos at 1700° C.—the average temperature of passages in regenerative steel furnaces. This resistance corresponds with approximately ten times the force to which the bricks are exposed in the passages. The stability of the latter is therefore assured. This mechanical resistance, retained at very high temperatures, is a special mark of silica bricks, and is found to be absent not only in clay bricks but even in those of magnesia, although the essential constituent of the latter, magnesium oxide, is still less fusible than silica.

The cause of these differences appears to be as follows: In both cases the bricks contain basic oxides in addition to the chief refractory material. These oxides—alumina, lime, oxide of iron, &c.—give rise in all cases, to a fusible substance which is liquid at temperatures in the neighbourhood of 1200° C. In the case of magnesia, the solid grains of this substance swim in the melted mass, passing easily over each other somewhat like sand in water. Silica, on the other hand—at any rate, if the bricks have been well baked—forms a continuous screen or film, in the pores of which the melted mass is contained, as water is in the pores of pumice-stone, without reducing the mechanical resistance. The formation of this screen, through the recrystallization of the silica, is due to differences of solubility between the different allotropic varieties of silica. Quartz, which is insoluble at a high temperature, dissolves in the melted mass and recrystallizes—first as crystobalite and then as tridymite. This recrystallization of the silica to form the screen requires effective baking at a suitable temperature and for a sufficiently long time. Bricks which are less baked, and in which the screen has not been formed, consist of grains of quartz floating in the melted mass—they are plastic like bricks of magnesia or clay. It is this difference which accounts for the familiar fact that under-baked bricks are fusible and useless.

When a good silica brick is heated, its resistance however drops as the temperature rises. This comes from the fact that since the solubility of the silica increases with the temperature, a progressive dissolution of the screen is produced, tending at first partially, and then completely, to disintegrate it. The occurrence of this effect is slower the better the formation of the screen to

start with; and it is on this item that the quality of silica bricks depends. A study of the factors which contribute to the stability of the screen has, therefore, considerable importance. The experiments made by the authors have aimed at investigating the parts which are played in this respect by the proportion of the fluxes, the actual temperature of the bricks, the good formation of the screen, and the disintegration of the screen by subsequent swelling.

As regards the proportion of the oxides employed as fluxes, a number of bricks found to yield particularly satisfactory results in practice have been analyzed. In the following table the percentage proportion of the basic oxides is given, as also the total weight of sulphates obtained by treating the bricks with hydrofluoric acid, followed by evaporation to dryness with sulphuric acid.

TABLE II.

Brand.	Al_2O_3.	Fe_2O_3.	CaO.	MgO & K_2O.	Total.	Sulphates.
Star . .	0·94	0·15	1·79	0·50	3·38	9·06
Assailly .	2·72	1·30	0·20	0·25	4·47	13·60
G. I. . .	1·02	0·60	1·48	0·00	3·10	8·40

The "Star" brick is one, as already shown, of high resistance. The Assailly brick, manufactured thirty years previously, had been for a year in one of the gas passages of a steel furnace. It was in the case of this sample that the transformation of quartz into tridymite as the result of long heating was first recognized. The brick "G I" is of French manufacture—one of the best made in France.

According to these figures a good silica brick contains from 3 to 5 p.ct. of basic oxide, while the weight of sulphates varies from 8 to 14 p.ct. The ratio of the weight of oxides to that of sulphates necessarily varies according to the nature of the bases. But since their relative proportions are generally comprised between fairly narrow limits, it may be said that the weight of oxides represents a fairly constant fraction of the weight of sulphate—say, 35 per 100. The estimation of the sulphates can be made very rapidly, and serves as a criterion of the composition of a silica brick.

The temperature at which the brick is heated will depend entirely on the use to which it is to be put. For steel furnaces it requires to bear a temperature of 1700° C. Bricks of the composition indicated above, if they have been well made, possess a resistance sufficient for this temperature. In the case of bricks for gas-retort furnaces, where the temperature is lower, a proportion of basic oxides double that just mentioned may be admitted, and greatly facilitate manufacture.

The most delicate part of manufacture is the formation of the screen. For its development it is necessary to keep the brick for a considerable time at a temperature where the melted mass remains sufficiently fluid. Experience seems to point to prolonged heating for several days at a temperature about 1450° C. as the most favourable condition. This temperature should be lower than that at which the quartz employed changes directly and rapidly into cristobolite. The screen is formed exclusively from portions of the silica which crystallize in the melted mass; and this recrystallization will be the more complete and rapid, other things being equal, according as there is more fine quartz in the mixture and according to the degree of fineness. Nevertheless, a certain proportion of large grains is necessary in order to prevent the formation of fissures, the spread of which would take place too easily if the material were uniformly fine.

If after baking there remain grains of quartz which have not been converted, and if the brick is afterwards suddenly raised to a temperature at which transformation of the quartz rapidly takes place, the swelling which accompanies this transformation breaks up the screen and destroys the stability of the brick. Moreover, the pressure which it bears in the furnace passage is opposed to lateral swelling and produces a species of scaling. The brick then falls into small pieces, producing sometimes in the course of several days the destruction of a furnace passage for which it has been used. This defect is, perhaps, the most serious, and certainly the most frequent, of those which attach to silica bricks of bad manufacture. In the making of a well-baked brick, the same swelling is produced at the moment of transformation of the large quartz grains, which thus dissolve only over a very small thickness. But the inconvenience is not the same, inasmuch as the swelling of the brick can develop freely in all directions, while the phenomenon is sufficiently slow to allow the screen to re-form at points where it may be broken. At the same time, this latter effect appreciably reduces the mechanical resistance of the brick.

In the following table are summarized experiments which have led to the foregoing conclusions. They have been made on bricks supplied by the works of the French Admiralty, the Ruelle foundry, and the Guerigny factory—their quality being indicated in the second column. The data include the proportion of sulphates, the absolute and apparent density, and the resistance to compression in kilogrammes per square centimetre at given temperatures and after a given period of heating.

These results allow of an exact practical conclusion being drawn—namely, that all the good bricks at a temperature of 1600° C., after heating for one hour, possess a resistance to compression equal to at least 10 kilos per sq. cm. The further heating at this temperature has little effect in reducing their resistance; while it has a very pronounced effect in the case of bad bricks.

TABLE III.

Brand.	Quality.	Sulphates. P. Ct.	Density.		Resistance.		
			Absolute.	Apparent.	Temp. ° C.	Time. Minutes.	R.
Assailly	Very good	13·6	2·30	1·92	15	..	550
					1600	60	90
Star .	,, ,,	9·06	2·33	1·66	15	..	170
					1600	5	33
					1600	60	30
G.I. .	,, ,,	8·40	2·33	1·88	15	..	185
					1600	60	41
R.B. .	,, ,,	13·1	2·35	1·60	15	..	62
					1600	60	9·5
R.L. .	,, ,,	14·3	2·40	1·85	15	..	265
					1600	5	41
					1600	60	25
G.A. .	Good	14·0	2·40	1·77	15	..	190
					1600	60	21
D. . .	,,	8·4	2·45	1·73	15	..	320
					1600	5	55
					1600	60	20
G.A. 1 .	Very bad	14·5	2·46	1·80	15	..	252
					1600	60	4·4
R.F. .	Very good	13·7	2·48	1·84	15	..	195
					1600	..	11
G.A. 2 .	Very bad	12·8	2·48	1·78	15	..	148
					1600	60	5
G.M. .	Medium	9·5	2·53	1·84	15	..	84
					1600	5	17
					1600	60	2
R.L. .	Bad	9·75	2·56	1·94	15	..	350
					1600	5	18
					1600	60	4·5
R.S.G..	,,	25·0	2·56	1·73	15	..	57
					1550	60	22
					1600	melted	

Gasification of Lignites.

Writing on the subject of the use of lignite, bagasse, and wood waste for power generation and other purposes, in the "Engineer," Mr. J. B. C. Kershaw states that lignite suitable for low-temperature distillation is characterized by a high content of bituminous matter. In the absence of this bitumen, the fuel is not adapted for the retort process, and is only suitable for direct burning. The two classes of lignite can be roughly distinguished by observing closely the changes that occur on heating, and by comparing the specific gravities of the samples. Lignites suitable for subjection to the retort process melt or soften before ignition, and burn with a smoky flame. They also possess a specific gravity between ·90 and 1·10. In Germany, the distillation of lignite is carried on at Halle and Messel, in vertical retorts, worked continuously; the brown coal being fed into the retort from a hopper. In the upper part of the retort, the lignite is dried; part of the steam produced being re-introduced into the retort further down so as to keep the temperature at the required low limit. The laboratory distillation of lignite used at Messel yields 44 p.ct. of moisture, 7·8 p.ct. of crude oil, 6·2 p.ct. of gas, and 36 p.ct. of coke. At Denver, in a plant erected for the production of briquettes and bye-products from the Colorado lignites, the retorts are 36 ft. long, 9 ft. high, and 1 ft. 6 in. wide. The charging period is 2½ hours, and the temperature limit 500° C. The average yield is 10,000 c.ft. of gas, 13 gallons of tar oils, and 2½ lbs. of sulphate of ammonia per ton. The gas is used for heating the retorts, as well as for steam generation. Mr. Kershaw remarks that the fact that many lignites are too poor in their content of bituminous matter to render distillation profitable accounts for some of the past failures that have occurred with plants erected for this purpose. Lignites of this type, however, are quite suitable for gasification, without attempting to recover the tar or ammonia. In New Zealand, the use of lignite producer gas for power production is common; the natural moisture content rendering it possible to work the producers without steam. Producers of this type, in which the upper part is used as a gas-retort and the lower part as an ordinary producer, have been employed with success in Germany and Austria for peat and lignite gasification.

The will of the late Mr. Fletcher W. Stevenson, of Coventry, has been proved; the amount being £15,470.

The Swansea meeting of the Refractory Materials Section of the Ceramic Society is, we understand, fixed for Thursday and Friday, Oct. 17 and 18; but the official programme is not yet ready.

Lecturing at the British Scientific Products Exhibition, Dr. M. O. Forster said that in 1878 the colour industry in Germany was four times as valuable as our own. Of £3,150,000 worth of coal-tar dyes produced in the world, Germany's output was valued at £2,000,000, four-fifths of which was exported; while Switzerland produced £350,000, and England only £450,000 worth. Confronted by these figures, he felt sure people would hesitate to believe those who said that in two or three years we should be able to do all that Germany could in regard to the dye industry. It would take us ten or fifteen years of unremitting labour, extraordinary industry, and patience before we could hope to achieve the position in this industry which Germany had reached before the war.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Use of Nitre Cake in the Manufacture of Sulphate of Ammonia.

SIR,—A typographical error in the sentence immediately subsequent to the "Water Balance," appearing in the article published in your last week's issue, on the subject of the "Use of Nitre Cake in the Manufacture of Sulphate of Ammonia," may admit of an interpretation other than that which I intended.

The article, as printed, refers to "this" gas-works; my typescript referred to "those" gas-works. The point I wished to urge was that the introduction of a 6 p.ct. solution of nitre cake along with the acid feed was quite feasible, having regard to the conditions obtaining at the Llwynypia Coke-Oven Works. The practicability of the process at such works, operating as they do the semi-direct or direct process, is attributable to the large volume of uncondensible gases (estimated at about 750,000 c.ft. per ton of sulphate of ammonia made) passing through the saturator, and the consequent greater volume of water carried away.

Where the volume of the gas is only 10,000 c.ft. per ton of ammonium sulphate made—and this applies to all gas-works, other than those operating the semi-direct process for the recovery of ammonia—it is evident, as is pointed out in the article, "that a higher concentration of the nitre cake solution is essential before the process can be satisfactorily worked."

May I ask you to publish the above explanatory letter, to obviate any possible misconstruction.

J. PARRISH.

Aug. 28, 1918.

The Household Fuel and Lighting Order, 1918.

SIR,—The article by Mr. Thomas Newton in your issue of the 20th inst., is evidently based on a misapprehension of the real meaning of the Order.

In the first place, the Coal Controller is obviously concerned to economize the consumption of coal; and as this fuel is utilized in three ways—viz., (1) for direct heating, (2) for the production of gas, and (3) for the production of electricity—it is necessary to find equivalent values for the coal used in each process.

A starting point is made by fixing 3 tons of coke as the equivalent of 2 tons of coal; and this is certainly a preference in favour of the coke. Now it is a good average result if 1 ton of coal carbonized produces 11,000 c.ft. of gas and 8 cwt. of coke for sale. But this 8 cwt. of coke is equivalent to $8 \times \frac{3}{2} = 5\frac{1}{3}$ cwt. of coal. Therefore, in producing the 11,000 c.ft. of gas only $20 - 5\frac{1}{3} = 14\frac{2}{3}$ cwt. of coal have been utilized; and 1 ton of coal would be equivalent to

$$\frac{11,000}{14\frac{2}{3}} \times 20 = 15,000 \text{ c.ft. of gas.}$$

It is also known by those concerned that a ton of coal will produce, on the average, in modern power stations, 800 units of electricity.

When we come to the scale allowance, however—say, for a seven-roomed house—15,000 c.ft. of gas (or the equivalent of a ton of coal) is allowed for gas lighting, but only 240 units (or the equivalent of 6 cwt. of coal) for electric lighting. Is this giving a preference to electricity? Surely it is rather an appreciation of the value of coal carbonization and the bye-products produced thereby.

The thermal efficiency of appliances (gas or electric) is a matter for the manufacturers thereof and the consumers. Nevertheless, it may be stated that 750 c.ft. of gas consumed in an inverted mantle burner should produce 12,000 candle-hours; whereas the equivalent 12 units of electricity will produce 9000 candle-hours with metal filament lamps. Again, is this a preference for electricity?

W. C. GOODCHILD.

100, *St. Chad's Road, Derby, Aug.* 28, 1918.

Gasholder Construction.

SIR,—Replying to the letter in your issue of Aug. 20 (p. 354), under the above heading, we would state that we, as well as other makers of gasholders, have for many years connected vertical stays and spiral guides to the circumferential channels of gasholder dips.

The patent referred to claims other advantages evidently not realized; so that if your correspondents consider the patent is not novel nor subject to proprietary rights, they have their remedy.

R. & J. DEMPSTER, LTD.

Gas-Plant Works, Oldham Road, Manchester,
Aug. 31, 1918.

Southend Gas Company's Meeting.—A decrease in the output of gas of 3·62 p.ct. as compared with the corresponding period of last year, was reported at the recent half-yearly meeting of the Southend Gas Company. The price of gas was increased 6d. per 1000 c.ft. from the Midsummer quarter; and the further rise in the cost of coal renders probable another addition to the charge for gas. The balance of the profit and loss account was £6453, from which it was decided to pay dividends at the rates per annum of 5¼ p.ct. on the original consolidated and the new ordinary stocks and 4⅜ p.ct. per annum on the new ordinary "B" stock (all less income-tax), leaving £682 to be carried forward. Reference was made in the report to the resignation of Mr. C. S. Shapley (the Engineer and Manager) on his appointment to Leeds, and the selection of Mr. Thomas F. Canning to succeed him; and the good work done by Mr. Shapley at Southend was remarked upon during the meeting. The Chairman (Mr. J. H. Burrows, J.P.) said the make of gas per ton of coal carbonized had been 12,680 c.ft., and the quantity sold 12,250 c.ft.—a very satisfactory result.

REGISTER OF PATENTS.

Rotary Gas-Engines.—No. 105,339.

TIBERTI, G. O., of Genoa.
No. 4768; April 2, 1917.

This invention relates to a gas-engine of the type in which a circular rotor keyed on the engine shaft and supplied with radially sliding pistons rotates inside two chambers of which the one is used for the aspiration and compression purposes and the other for the explosion of the gas mixture and the exhausting of the products.

The object of the patentee is to produce a gas-motor in which the stator is composed of an annular cylindrical central body with hollow water jacketed end plates bolted to it, which together enclose two concentric elliptical compartments, with their relative axes placed at right angles to each other, and in which are rotated (with the shaft upon which they are fixed) two rotors, each composed of two discs bolted together and having formed in them four pockets, in which are mounted spring-pressed radially slidable pistons, the outer ends of which are provided with sliding shoes held in tight contact with the inner surfaces of the elliptical compartments in which the rotors respectively rotate.

Machines for Breaking Coke.—No. 117,585.

SIMS, A. G., of Reading.
No. 4266; March 11, 1918.

A machine made in accordance with this invention comprises a body or frame, two or more shafts mounted on bearings, means for adjusting the distance between the shafts, and means for permitting the shafts to yield and separate momentarily under excessive strain. It is characterized in that the cutters or rolls are so mounted on the sleeves on the shafts that the shafts can be withdrawn and the cutters or rolls removed collectively, without disturbing the gear wheels or any other part of the machine.

Destructive Distillation.—No. 117,645.

TURNER, C., of Irlam, near Manchester.
No. 8743; June 18, 1917. No. 17,298; Nov. 23, 1917.

This combined invention consists in distilling carbonaceous materials—such as peat, lignite, oil shale, oil impregnated material, or coal—in a vessel the pressure in which is alternately raised and lowered, as the patentee claims to have found out that processes of destructive distillation generally are advantageously conducted in a vessel which is alternately closed until the pressure therein has been raised to a desired maximum and then opened whereby the pressure falls rapidly from the maximum solely by expansion.

The products obtained by conducting the destructive distillation in this manner may, he points out, be different in respect of proportion or nature (or both) from those obtained when the pressure is not purposely varied; the outstanding difference in the case of most kinds of carbonaceous materials being the larger proportion of oils and the smaller proportion of pitch. The invention is applicable with any mode of heating, whether external or internal; but inasmuch as known methods of heating, which consist in passing heated elastic fluid over or through the material in the vessel, afford particular facility for varying the pressure within the vessel, this mode of heating is generally preferable.

The invention may be applied (for instance) by charging the material into a retort having one or more inlets for a heating agent—such as superheated steam—and one or more outlets for the agent and the volatile products of carbonization which accompany it. The outlet is alternately throttled and opened for the passage of the elastic fluids by a valve which may be automatically operated by known mechanism depending for its action on the pressure within the container or on some external force. The superheated steam is passed into the container for a certain period of time, or until the pressure indicated by a manometer has risen to the required value. The valve then opens for a certain time—long enough to allow the pressure within the container to fall to that which has been decided upon as the lower limit. The outlet from the container is connected with some system of plant for collecting the products of carbonization, constructed in respect of dimensions with due regard to the sudden flow of products and agent at each reduction of pressure.

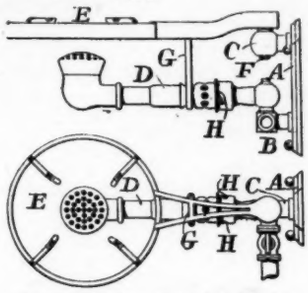
The invention is applicable to processes of continuous and semi-continuous carbonization as well as to processes of intermittent carbonization; and it is applicable to a variety of carbonaceous materials, requiring, as is known, different conditions of temperature and rate of carbonization. As a specific example, he cites the following conditions as the best at present known for carbonizing peat with the object of obtaining the maximum yield of oils. A cylindrical iron container 2½ ft. diameter and 7 ft. high is connected at the bottom through a stop-valve with a boiler adapted to generate steam at 20 lbs. pressure above atmospheric, and at the top through a like valve with a condensing plant. It is provided with a manometer, and is jacketed with a bad conductor of heat. The container is charged with air-dried peat which has been coarsely disintegrated; and steam is blown through it until the air has been expelled. The valve on the outlet is now closed, and steam from the boiler is passed through a superheater capable of raising its temperature to 500° C., and into the container until the manometer indicates 5 lbs. per square inch pressure. The valve on the inlet is then closed, and that on the outlet opened, until the pressure indicated by the manometer has fallen to 2 lbs. per square inch. The outlet valve is then closed and the inlet valve opened, and the pressure allowed to rise again to 5 lbs. per square inch, and so on—the operations being repeated until observation of the condensing plant shows that there is no longer any substantial distillation of products.

Boiling-Ring Gas-Fitting.—No. 117,796.

COOKE, J. J., of the South Metropolitan Gas Company, Old Kent Road, S.E.

No. 7567; May 6, 1918.

This combination gas fitting is intended to be mounted adjacent to an ordinary fire-place. It comprises a bracket plate and an ordinary socket for a hinged gas-bracket on the plate; while above the gas-bracket socket, and arranged on the same centre line, is another socket unprovided with a gas supply.



Cooke's Boiling-Ring Gas-Fitting.

A is the bracket plate; B, the gas-bracket socket carried by it; C, a socket without gas supply, arranged in line with the socket B. D is the gas-bracket socketed into the socket B in the ordinary way; and E is the ring frame socketed into the socket C by means of the pendent plug F. G is a pendent strut on the ring frame E adapted to rest upon the bracket B and aid in supporting the ring frame. The bracket D is in two parts, detachable at the bayonet joint H, which enables the burner shown to be removed and one to be used as a fire lighter to be substituted. Or the ring frame E may be removed and the burner then be used as a fire lighter by turning the bracket so as to project the flame into the fuel in the grate.

Treating Gases with Liquids.—No. 117,843.

WILTON, N., and the CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE COMPANY, LTD., of Hendon.

No. 11,039; July 31, 1917.

This apparatus is suitable, for example, for treating coal gas with water for the extraction of ammonia, or for treating it with oil for the extraction of benzol. The plant is of the type in which successively the gas flows in one direction and the liquid in the opposite direction, and means whereby the liquid in each chamber is circulated over surfaces to bring it into contact with the gas. But here the liquid in each chamber is sprayed on to stationary contact-surfaces in the chamber over which the gas passes, and each chamber is provided with means for directing the gas so that it flows over the surfaces in the chamber always in the same direction as the liquid flows over them, instead of, as usual, in the reverse direction. According to another feature of the invention, the circulation of the liquid in each chamber is effected by a pump of the air-lift type, supplied with a portion of the gas passing through the apparatus—preferably gas which has already been treated in the apparatus.

The vessel shown is provided with partitions A to form a number of separate chambers A^1. The gas inlet B is at one end of the vessel, and a corresponding outlet C at the other end; and each partition has suitable openings near the top to permit the transfer of the gas from chamber to chamber. Each chamber has a baffle provided in it extending from the top down past the opening towards the bottom, so that any gas passing out of the chamber must do so from the lower part of it. Thus the gas enters each chamber near the top, passes downwards through the chamber, and, entering a channel formed by the baffle and the next partition, passes upwards and out into the next chamber by the opening at the top.

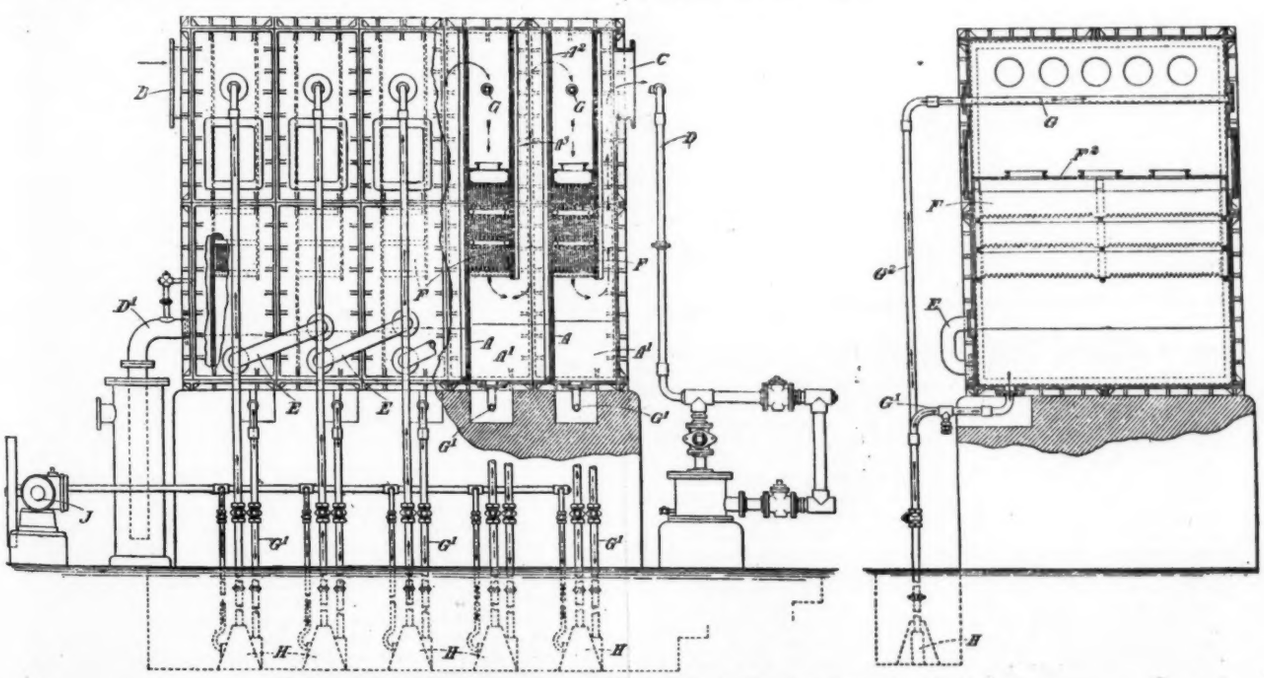
A suitable inlet D and outlet D^1 are provided for the liquid with which the gas is being treated. The inlet is arranged to deliver the liquid into the chamber A^1, which also has the gas outlet C provided in it; and the liquid outlet D^1 is provided on the same chamber as the gas inlet B, so that the liquid flows through all the chambers A^1 in succession in the opposite direction to that in which the gas flows through them. The liquid is transferred from each chamber to the next one by an overflow pipe E arranged at such a height as to withdraw liquid from the surface in one chamber and deliver it into the bottom of the next chamber.

To ensure that the gas and liquid are brought into intimate contact with one another to the desired extent, the liquid in each chamber A^1 is circulated in that chamber and caused to flow over contact-surfaces F, over which the gas is also caused to flow. These surfaces may take any desired form—such, for example, as bundles of wooden boards spaced apart by distance-pieces and supported in the middle of the vessel; but various kinds of contact-surfaces can be used, depending upon the liquid and gas that are to be treated. The contact-surfaces are supported on framework carried by the partitions and baffles. A perforated plate F^2 is mounted above the contact-surfaces so as to distribute the liquid over them. The contact-surfaces are removable through an aperture in the side wall or top of each chamber in order that they may be renewed, cleaned, or otherwise dealt with when necessary.

The liquid is sprayed on to the contact-surfaces from a perforated pipe G near the top of each chamber; and the means for circulating the liquid in each chamber comprises one of the features of the invention. The liquid is withdrawn by a pipe connection G^1 from the bottom of each chamber and is raised through the pipe G^2 to the top pipe by a pump—preferably of the air-lift type—indicated diagrammatically at H. These pumps are operated by gas which has been passed through the apparatus; the gas being withdrawn from the gas outlet and compressed in a compressor J to the pressure necessary to effect the lifting of the liquid.

In the operation of the device the gas enters at B the first of the chambers, which may or may not be provided with contact-surfaces, and then enters the second chamber A^1 through the top openings, and passes downwards through it. Liquid from the bottom of this chamber is continuously circulated by the pump H and sprayed into the chamber from the pipe G, so that it passes downwards over the contact-surfaces F, in the same direction as the gas passes over them. This liquid has passed through all the previous chambers—"treating the gas therein; and it effects the initial treatment of the incoming gas." The gas passes from the lower part of this chamber, immediately above the level of the liquid in it, and into the top of the second chamber, where the process is repeated; and then through each chamber successively in the same way. The final treatment of the gas is effected with fresh liquid just introduced in the apparatus at the inlet D. The gas then passes to the outlet C, and a small portion of it may be withdrawn into the compressor J for use in the pumps H.

It will be seen therefore, the patentees point out, that this invention provides an effective apparatus for treating gases with liquids on the stage or counter-flow principle, and that the only moving parts of the whole apparatus are the compressor, which is a simple small machine quite independent of the apparatus itself, or the mechanical circulating pumps where these are used.



Wilton's (Chemical Engineering Company) Apparatus for Treating Gases with Liquids

Storing Gases.—No. 117,842.

SHORT, F. C., and MOORE, F. W., of Walsall.

No. 11,001; July 31, 1917. No. 12,444; Aug. 30, 1917.

This invention has for its object to utilize for the storage in small bulk of coal gas or other gas the absorptive powers of certain substances for the gas at atmospheric pressure, together with their still greater absorptive powers under higher pressures. By the application of this method the storage of coal gas, for commercial purposes—such as for fuel for internal combustion engines, for lighting or heating purposes, or for purposes of transport—is said to be "rendered much more practicable than by methods of storage hitherto applied, as, for example, at normal pressure in a gas-tight container or under higher pressures in pressure-resisting cylinders or containers."

As an example, the patentees cite the employment of an iron impregnated charcoal. In this case the charcoal (preferably cocoa-nut shell charcoal) may be treated with ferric chloride, and the salt be subsequently reduced to the condition of finely-divided metallic iron by a suitable reducing agent—such as coal gas. The absorbent properties of this combined material are found to be enhanced by powdering the material; and preferably this is effected by powdering the charcoal previous to treatment with a metallic salt solution. The particular structure or form of the material will, however, be determined to suit the conditions of use. If a powdered form is used for such purposes as the storage of fuel for an internal combustion engine, it would be desirable to provide means—such as a fine gauze or asbestos wool screen or the like—to prevent the powder being carried out of the receptacle with the gas.

In the example mentioned, an iron and charcoal combination, 1 lb. of cocoa-nut shell charcoal impregnated with finely-divided metallic iron, consisting of 18 p.ct. of its weight of iron and the remaining 82 p.ct. of its weight of charcoal, and having a degree of fineness such that it will pass through a sieve having thirty meshes to the inch, but not through one having sixty meshes, absorbs approximately 0·5 c.ft. of coal gas at atmospheric pressure.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Aug. 28.]

Nos. 13,426–13,834.

BATES, A. D.—"Gas-producers." Nos. 13,673, 13,674.

CLARKE, J. V.—"Process for production of ammonia, ammonium hydrate, and ammonium salts." No. 13,471.

COLLYER, C. R.—"Means for lighting gas." No. 13,677.

CURPHEY, W. S.—"Production of chemical compounds." No. 13,596.

DOCKING, A.—"Gas-heated cylinders for drying or roasting malt, &c." No. 13,715.

DOCKING, A.—"Gas and air mixing apparatus for producer or suction gas generators, &c." No. 13,777.

DUVOISIN, A.—"Acetylene burner for central heating systems." No. 13,515.

GANNON, J. W.—"Gas-stoves." No. 13,564.

GRAEMIGER, B.—"Device for measuring or controlling velocity of flowing fluid." No. 13,609.

KENT, A. T.—"Settings for retorts." No. 13,678.

LANCE, J.—See Duvoisin. No. 13,515.

LEVI, H.—"Refractory blocks, fuels, radiators, &c." No. 13,710.

M'LEOD, H. N.—"Apparatus for extracting products from peat, carbonaceous substances, &c." No. 13,638.

MAXFIELD, S. N.—"Incandescent gas lighting." No. 13,684.

MULLINER, H. H.—See Kent. No. 13,678.

PARKES, H. C.—"Manufacture of mixtures of mineral oils and coal tar." No. 13,610.

PEARSON, R.—See Parkes. No. 13,610.

QUINN, A.—"Gas-stoves." No. 13,564.

RARE METALS, LTD.—See Clarke. No. 13,471.

RUESCH, E.—See Duvoisin. No. 13,515.

SHARP & PRESTON.—See Docking. Nos. 13,715, 13,777.

WELLINGTON, S. N.—"Apparatus for quenching coke." No. 13,452.

WELLINGTON, S. N.—"Apparatus for mixing gaseous fuels." No. 13,737.

Chichester and Financial Hardships.—There was reported at the half-yearly meeting of the Chichester Gas Company an increase of about 6 p.ct. in the sale of gas, as compared with the corresponding six months of the preceding year. Out of the net revenue of £1640, the Directors recommended a dividend of 5 p.ct. per annum on the "A" capital stock and 3½ p.ct. per annum on the "B" and "C" capital stocks. Mr. W. A. Walker (the Chairman) said the total expenditure had increased by £1280; and the income was more by £1207. The inferior quality of the coal they had been compelled to use necessarily adversely affected the yield of gas and the percentage of bye-products. They had, however, managed to sell 10,825 c.ft. of gas per ton of coal carbonized; while the yield of residuals had worked out at 52·62 p.ct. on the cost of the coal. Taking into consideration the difficulties under which they had been working, he thought the results of the half year might be regarded as favourable. Following the ordinary meeting, an extraordinary meeting was held, at which a resolution was unanimously passed empowering the Directors to make application to the Board of Trade for relief under the "Financial Hardships" Act.

MISCELLANEOUS NEWS.

WANDSWORTH, WIMBLEDON, AND EPSOM DISTRICT GAS COMPANY.

The Half-Yearly Meeting of the Company was held last Tuesday, at the Cannon Street Hotel, E.C.—Mr. H. E. JONES in the chair.

The SECRETARY (Mr. Chas. W. Braine, F.C.I.S.) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

GENERAL VIEW OF THE POSITION.

The CHAIRMAN, in moving the adoption of the report and accounts, said no one could begin an address in these days without reference to the war, because, like the poor, it was always with them. Perhaps, if their financial relief did not seem to be very great, their spirits were relieved by receiving the news which was now coming across from France day by day. There would be considerable satisfaction on the Directors' side of the table, and for everybody connected with gas, when the war and its limitations were things of the past, because the limitations they had had at every step, and the prescriptions they had to abide by—often coming with a great deal of authority, and not much experience—had enhanced the troubles and the difficulties of the unfortunate Directors and officials. The report told the proprietors that the profit was £33,923; while the interest and dividend, taken together, required £34,812, which left a deficit of £888. This would have to be taken from the reserve fund, if the dividends recommended were adopted. Incidentally, he might tell the proprietors that the sale of gas for the first time in the history of the Company (with which he had been connected for something like 58 years) was less by 3·4 p.ct. He was sorry; and more so because this appeared to be accompanied by rather a large amount of unaccounted-for gas, which made him think they must look into the matter, as he was not at all satisfied with it. The reserve fund would not stand much further hammering. If the proprietors looked at the account, they would see that there was now only £7388 in the fund to which to resort. This being the case, they did not want to go to it for much more; and the Directors must try to so budget in the future that they did not call upon the fund to any serious extent.

AN APPLICATION UNDER THE TEMPORARY INCREASE OF CHARGES ACT.

With regard to the dividends, he might as well point out here that the dividend on the Wimbledon stock would, after the dividend now to be paid, be down to 3¾ p.ct., owing to the increase in the price of gas from June. This would be three-quarters of the standard dividend of 5 p.ct. to which the holders of this class of stock were entitled. In view of the fact which he must not conceal from the proprietors, through the humbugging about of the wages and coal charges, they were undoubtedly in for a further rise in these things. With another rise in the price of coal, another rise in the price of gas was imminent; and therefore they would at once have to apply to the Board of Trade, under the new Statutory Undertakings (Temporary Increase of Charges) Act, to enable the Wimbledon stockholders to continue to have 3¾ p.ct., whatever the price of gas might be. It was only a small mercy, but still a mercy.

THE COMPANY'S ACT.

The Company's own Act had received the Royal Assent. Under it, they had power to raise £100,000 of debentures, which were redeemable within fifteen years, so as to avoid burdening the Company for ever with ordinary capital which would only sell to-day at a very low price, owing to the reduced credit of gas undertakings on the Stock Market. This would have meant that they would have had to pay a heavy extra dividend as the prices of materials recovered to something of their old levels, and the price of gas was reduced. Another important provision in the Act was the power to close some footpaths across the estate that the Company bought some years ago, which had a fine embankment on the Thames, and included about 22 acres of land, which until recently was comparatively naked, but upon which they hoped to develop gas-works in the future. Inasmuch as part of their old works had upon them some obsolete plant, they were now, in spite of war conditions, rebuilding part of them so as to make gas on better terms and conditions. Thus before the war was over, if they could get the works finished, they would obtain financial economy from them. The construction of the new works could not be further delayed; and the closing of the footpath would be a great thing for the Company. The purchase of the land and the closing of the footpath were authorized in 1912; but with the hasty drafting which always took place on these occasions, they swallowed a condition under which they were to buy all the property abutting upon the footpath. They did not see then that the tramways system of South London would be so extended that an enormous tramway station would be erected there, which, of course, the Company could not possibly buy. This difficulty had now been removed; and they had permission to close the footpath without buying the tramway station. In this way, the Act was of considerable importance to the Company.

CRITICISM OF THE ACTION OF PARLIAMENT OVER THE "RELIEF" QUESTION.

They did not seek, in this measure, for any relief from what had come to be known as "financial hardships." But this made no difference, because the other companies who did promote Bills dealing with the matter had had them "turned down," and those companies with Bills dealing with other subjects, in which clauses appeared seeking for relief, had had these clauses removed, in view of the passing of the Public Act. The whole system of charges and dividends had been reviewed by Parliament, and, in his opinion, in an extremely narrow way, giving gas share and stock holders only three-quarters of the standard or maximum dividend, which was not the dividend they had been receiving, because in this Company they had always had extra

dividends owing to the moderate price at which gas was sold. In view of the position of the Wimbledon stockholders, if the Company again raised the price of gas, it would, as he had said, be necessary to avail themselves of the Increase of Charges Act, although holders of Wandsworth "A," "B," "C," and the new ordinary stocks, as well as those holding Epsom stock, would be safe for a long time to come, if not for all time. In coming to the conclusion to give gas companies a limited and stinted relief, he did not think that Parliament understood the whole question, nor was he sure the members of the Select Committee who were appointed to investigate it understood it. The Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter, D.Sc.) pointed out, in his speech to the proprietors of the Company, that a distinguished statesman—a member of a former Government—confessed he had never been able to give his mind to understanding the sliding-scale. It was really a very simple thing. If gas companies could succeed in selling gas at a certain price, they were allowed to pay a standard dividend. If they did not so succeed, and had to charge a higher price, the dividend had to be lowered. He did not think this should have defeated the ability of a gentleman who was competent to fill a Government office, but one never really knew. [Laughter.] There appeared to have been some conflict over the matter in the minds of the House of Commons; and it was clear many of the members did not distinguish between the standard dividend and the dividend actually paid. They certainly did not understand the difference between maximum and standard prices and dividends, nor did they understand that the prices at which stock would sell when a company was paying a dividend much in advance of the standard dividend meant that money was being found by the public at a very much lower rate than was represented by the nominal dividend on the shares. Whether it was the fault of the promoting gas companies that the point was not understood by the Committee, he did not know; but the position was described by two of the ablest and most responsible witnesses that could be found. Therefore, he thought the defect must have been not in the evidence but in the Committee, or the goodwill of the Committee.

THE ADVANTAGE OF THE SLIDING-SCALE.

He might say with regard to the sliding-scale of prices and dividends that the Company was about the second to take this form of legislation. The gas company for whom he was then acting as engineer—the Commercial—was the first. He was prepared to say the sliding-scale was not a failure in any sense of the word. It was better than a maximum price unless the latter had in it a large margin, because the maximum price shareholder was a maximum dividend shareholder; and when the maximum price was reached, he had then either to shut-down his works or find the loss, which would mean losing their money. With a sliding-scale dividend, the Company could charge what they liked, because there was no forfeiture other than the loss of the dividend. The sliding-scale had put the stockholders of their own Company in a good position, as the dividends now recommended were not relatively bad, seeing that this was the fourth year of war conditions, which had become increasingly worse.

THE BURDEN OF UNFORESEEN DIFFICULTIES.

He would not go over their difficulties in detail; but they were difficulties in connection with coal and labour, and materials of every sort were almost unprocurable, and almost at famine prices. They were faced more and more with irresponsible and hasty interference. Without notice, coal at the pithead had been pitchforked up in price—not merely by the 4s. per ton at the outset of the war, but by 2s. 6d. last autumn, and within the past few weeks by another 1s. 6d.—together 4s. This last 1s. 6d. was put on immediately after the arbitration over wages, which alone necessitated a rise in the price of gas. The arbitration as to wages was raised by a representative of one of the Labour Unions up North, who wrote to a Government Office making an application on behalf of gas workers generally, with the result that an arbitrator was appointed. When the matter came forward, a speech was made by one man on behalf of the gas workers, and one on behalf of the gas industry. No evidence was given; and the result was that the arbitrator landed the company into an addition to their expenditure of about £25,000 in one half year. He was himself an old arbitrator; and, in accordance with the custom on such occasions, he was in the habit of having evidence offered to him, verified by documents, and the witnesses sworn. But in this labour arbitration to-day, these safeguards to a correct decision were not followed. There were the working men on one side; the employer on the other. The latter had to take the consequences.

THE FUEL AND LIGHTING ORDER.

There was still another difficulty facing them; and it could not be "blinked" in view of the limitation of the consumption of fuel. This was an interesting subject, because he felt that in fuel was the great hope of the future of all gas undertakings. But the Fuel and Lighting Rationing Order meant that the consumers were not to burn gas as freely as last year; and this must necessarily also mean that the Company's standing charges were going to be bigger per unit of consumption owing to the smaller sale. This had been pointed out very clearly by the Chairman of the Tottenham Light, Heat, and Power Company (Sir Daniel F. Goddard, M.P.), because they were liable to lose an amount of business which could not be estimated beforehand, but which would be considerable owing to the fact that they had been developing the fuel-gas business as largely and widely as possible.

FEATURES OF THE ACCOUNTS.

As to the accounts, he could not compare them in the way he was in the habit of doing, seeing that the whole of their features were so different, owing to the changed conditions. For example, the bonus additions that had been made to wages on account of the war prices of food had now been divided over the various items of wages. But it came to the same thing in the accounts. However, although the amount was distributed over manufacture, distribution, management, and residuals, there was a footnote (which he hoped would always be adhered to) showing what the war had cost extra in wages in the half year. For the past half year, the footnote showed that close upon £35,000 was spent in the way of extra wages. The amount carried to profit and loss account (which covered the best part of the sum needed for dividend) was £33,923; so that if they had not had this extra sum to pay in wages, and other conditions had been the same, they would nearly have doubled the profits. While he did not say that the war had not brought heavier expenses to the men, he did say that nothing had justified the extravagant addition involved by the 12½ p.ct. which had been put upon the Company, and was made to attach not only to the war food allowance, but to the payments for overtime and ordinary working time. As to the income, through having raised the price of gas they had received £53,625 more for gas, and £2313 less for residuals, which was due to the wages being charged against them under the late settlement. Rental of meters and stoves was nearly as possible the same. They had £52,187 more income in the total. On the other side of the accounts, the expenditure was £40,729 more; and the profit £11,458 more, which made the £52,187.

THE CAPITAL ACCOUNT.

In the capital account, they would find the extraordinary information for the first time that capital had grown, in face of the decrease of 3·4 p.ct. in the sale of gas. They had spent £29,455, a large part of which was for new works. This was for the purpose, as he had said before, of replacing old-fashioned and obsolete plant, and for larger plant; otherwise there would be no capital charge. It would be against their policy to charge to capital what was disproportionate; for as he had told the proprietors before, they did not raise capital at the same rate as they sold extra gas. War prices for material and labour were ruling now; but the fact that they were building these works somewhat in excess of what would be their present requirements was a good thing, because there was no doubt prices of labour and materials would remain very high, and be difficult to get. So they were taking "Time by the Forelock." There was a credit item of £61,686 due to the loss on ships, which brought them £45,000, and the compensation from the Government for taking another big ship from them made up the £61,686. This over-balanced the expenditure on capital account, and gave a credit of £32,231. Still he was not glad to see the figure in the accounts. They would rather have the ships, because, like all gas companies in the Thames Basin, for all time in the past the cheapest way of getting the best gas coal was from Durham by sea. But the chances of war had produced charges for insurance and other things, which, with the regulation of shipping for safety, had raised the expenses of this mode of transport so tremendously that the cost of coal into the works by rail was something like 7s. or 8s. cheaper than by sea. Ordinarily, it would be 7s. or 8s. the other way. Temporarily, therefore, they were at a disadvantage compared with gas companies who had railborne coal. When, however, the war was over, and they returned entirely to ships, they would get back some of the great advantage they formerly had over railborne coal. This would explain why some of the smaller gas companies in the North of London with railborne coal were not to-day in a very much worse position compared with their own Company. But he would, in spite of the extra cost, rather have the ships for bringing the coal; for the train arrangements in the hands of the Coal Controller were simply insufficient to keep them going properly. He had, in fact, the gravest fear that in the course of next winter they might be in a real fix in regard to coal supply. The stock of coal at Wandsworth was a good 20,000 tons less than this time last year. This was not a pleasant prospect when they had the demands of winter to face.

GAS UNDERTAKINGS AND ELECTRICAL SCHEMES.

He came to the most favourable feature of his observations. Some of the proprietors had no doubt seen a great deal lately as to what the electricians were proposing to do, and how they were going to practically wipe gas undertakings out when they got their grand schemes, aided by Government grants, and so forth. The problem for the gas company and the ordinary citizen was to get fuel into his house. They might have coal at the railway station; but if there were no carts and horses to take it to the consumers' houses, it was not of much use to them. But with a gas-pipe in the house, by turning a tap on, the householder could at any rate cook his food and keep himself warm. This was the business the gas companies had already secured; and this was an area into which the electricians could not follow them. Almost everywhere, something like 90 p.ct. of the houses had a gas supply in them. The gas was not all burned for lighting, which was what in residential areas the electricians were always seeking for, but for warmth and cooking chiefly. This being so, when war was over, and they were working under normal conditions again, gas companies would be in the position to give every resident, whether living a few miles from a railway station on a country road, or in a community like London, cheaper fuel if he burned it scientifically, than any other heating agent could give him. The electrical scheme proposed large power stations to economically supply big industrial centres; and these stations would be located near where they could get cheap coal or other fuel. This had never been the object of the gas companies, which were originally founded for lighting purposes; but gradually they had grown into the heating business. They had, as he had remarked, gas in nearly every house in the whole area supplied. And nobody would ever get it out again, because there were no other means by which coal could be so economically and scientifically used for the purposes of the consumer. Electricians could not touch them in this. His old company—the Commercial—supplied a large quantity of gas to the Mint for coining and smelting—perhaps as much as would be taken by 20,000 or 30,000 houses. They also supplied large quantities to ship-building yards, and for pumping and other purposes. But these were more or less casual supplies. If they lost them to-morrow, it would not be a large percentage loss on their entire business. In Wandsworth, their own Company supplied for burning-off mantles nearly as much gas as was used in the Mint. He believed they had the largest business of this kind; but they did not depend upon it. What they did depend upon was the working-man's supply of 22,000 or 23,000 c.ft. per year, which enabled him to meet the whole of his domestic requirements. This was business which was not going to be taken from gas companies. The man who had gas in his house could use the incandescent light, and he was not likely to take on the electric light. The rich man might like to have the electric light in his drawing-room, and gas in his kitchen and passages. If the gas com-

panies supplied the kitchens, passages, and bedrooms, the other man might have the drawing-room. There was no danger to the gas industry; there was no fear of gas undertakings being extinguished. They had never had the idea of large iron-works running on their output. Gas-works were not built for that sort of thing. They could not have a big iron-works in London. It was not suitable. Where such works required cheap fuel, they would probably make their own gas on a large scale. The electrical conduction of power from a large centre was an excellent and economical idea. But this was not what gas undertakings had to do; and it was not what, so far as the proprietors' property was concerned, they would aim at. He wanted to give the proprietors a little ray of sunshine, which he hoped would come to them again when the war was over. There was not the slightest fear of their property being damaged, much less extinguished, by anything the electricians could do. When he looked at the Stock Market List, and saw the miserable prices at which the Company's stocks were quoted, he begged of proprietors not to sell; but, in the words of the Prime Minister, he said "Hold fast, and all will be well."

The DEPUTY-CHAIRMAN (Mr. R. Garraway Rice) seconded the motion.

Mr. ALLEN made some observations dealing with the economic conditions of the present time.

The motion was unanimously carried.

THE DIVIDENDS.

On the proposition of the CHAIRMAN, seconded by the DEPUTY-CHAIRMAN, dividends for the half year were declared at the following statutory rates per annum (less income-tax): On the Wandsworth "A" stock £6 7s. 6d. p.ct., "B" stock £4 17s. 6d. p.ct., and "C" stock £4 9s. 3d. p.ct.; on the Wimbledon stock, £4 5s. p.ct.; on the Epsom stock, £4 17s. 6d. p.ct.; and on the new ordinary stock, £4 9s. 3d. p.ct.

VOTES OF THANKS.

The CHAIRMAN moved a resolution thanking the officers, staff, and workmen for their services in these particularly troublous and difficult times. Their work, he remarked, had contributed to give to the proprietors dividends which, in the circumstances, could not be considered unsatisfactory. The Company was established under very favourable conditions; and this had enabled it to weather the storm very satisfactorily. He hoped the proprietors would not be reduced to a much lower plane in the remuneration they were getting for their capital.

The DEPUTY-CHAIRMAN seconded the motion, which was heartily passed.

Mr. BRAINE having replied for the secretarial staff,

Mr. H. O. CARR, in responding for the staff, workmen, and himself, asked to be allowed to include the workwomen, of whom they had now a fair number doing good work. Staff, men, and women alike all had the best interests of the Company at heart; and although these were pretty strenuous times, they did the best to get through the work which had to be done.

Proposed by Mr. W. RICHARDS, and seconded by Mr. SAMSON, a cordial vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN'S acknowledgment of the vote concluded the proceedings.

BARNET DISTRICT GAS AND WATER COMPANY.

Despite War Conditions, a Healthy Position.

The Half-Yearly Meeting of the Company was held on Monday last week—Mr. A. F. PHILLIPS in the chair.

The SECRETARY (Mr. E. W. Drew) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN, in moving their adoption, said the results of the half year, considering the many difficulties gas companies had to contend against, were satisfactory. There had been no addition to the capital expenditure, which remained the same as last half year—£151,645 on the gas, and £401,064 on the water undertaking. The sale of gas showed a slight decrease of 2,073,600 c.ft., due probably to the instructions issued to consumers at Lady-day, informing them that the consumption of gas for domestic use must be reduced by one-sixth. The gas-rental was £19,848, which was £1204 more than the corresponding half year—the price of gas having been 4d. more per 1000 c.ft. Products realized £6339—an increase of £1081. On the other side, coal showed a further cost of £1164. The charges for mains and services were £264 less. Repairs of meters £204 less; and stoves and fittings £604 less—there having been few additions during the half year. War bonus and allowances to employees increased by £426. The resulting profit was £5560. Regarding the water undertaking, the rental was £25,510—an increase of only £443. In the expenses, repairs of works cost £675 more. Pumping charges were up £305; and allowances and war bonus were £190 more. All other expenses were much the same. The resulting profit exhibited a decrease from £14,455 last year to £13,642 this year. The increase in the total wages paid was at the rate of £4000 per annum. The profit from the gas undertaking, £5560, and from the water undertaking, £13,642, added to £255 received for interest, less interest on debentures and income-tax, £6259, left £13,199. Of this, the dividends would absorb £10,754; and it was proposed to add £2000 to the contingency fund—leaving £444 to add to the carry-forward, which would then stand at £24,173. To meet the increase in the cost of coal, wages, and all other material, the price of gas was again raised 4d. per 1000 c.ft. from Midsummer. Shortly after this decision, on June 24 the price of coal was further advanced 2s. 6d., and on July 6 an addition of 1s. 6d. was made—together an increase of 4s. per ton. It was possible that a further advance in the price of gas might be necessary to meet this extra expense. The dividends had not so far been affected, because the Company had not paid the full maximum dividend. The past half year had been one of some anxiety for the Company. There had been the two increases in the price of coal, the demands for increased wages, and the notice from the Coal Controller to limit the stocks of coal that could be held. The rationing of fuel and lighting might result in reducing the quantity of gas sold, and consequently add to the burdens of the Company, because, as the standing charges would remain the same, there would be a reduction of profit available for dividend. Then there had been the long consideration of the Bill for giving relief to those gas undertakings whose statutory provisions prevented them from maintaining their dividends in consequence of the price of gas being raised to meet the increased cost of everything required for producing it. There was considerable discussion over the Bill, which only resulted in protecting dividends up to three-fourths of the standard or maximum. It was a meagre recognition of the services which the gas companies had rendered the country. If the present conditions of things continued, it would have to be re-considered. The proprietors, however, had heard and read so much on this subject that it was not necessary to say more. He recently paid a visit to the gas-works and all the pumping-stations, and could assure the proprietors that they were in excellent order. Few gas-works the size of Barnet were so well provided with mechanical arrangements. So long as the coal arrived by rail, there was little hand labour in the carbonizing of it. It was conveyed to the hoppers, placed in the retorts with charging machinery, which also discharged the coke, and a coke-conveyor took this to the screening-hoppers, where it was stored ready for sale. The five pumping-stations were in equally good order, and reflected much credit on those who had charge of them. He suggested if any of the proprietors happened to be in the neighbourhood, to pay a visit to Tyttenhanger, the Company's principal pumping-station. They would realize how efficient and pleasant a water-works could be made. The whole of the staff and the employees had satisfactorily carried out their duties; but the Directors had had to make advances in wages to meet the increased cost of living. It was not possible to forecast the future. Much depended upon the cost of coal, the obtaining of sufficient supplies, labour difficulties, and how far the consumption of gas might be reduced. However much trouble the Fuel and Lighting Rationing Order might cause, it had to be realized that the consumption of coal must be reduced. This was vital to the prosecution of the war, and the defeat of the enemy.

The DEPUTY-CHAIRMAN (Dr. J. W. L. Glaisher) seconded the motion, which was unanimously passed.

On the proposition of the CHAIRMAN, seconded by Mr. COLIN DOGWRA, dividends for the half year were declared at the rates per annum (less income-tax) as follows: 9 p.ct. on the "A" and "C" stocks, 8 p.ct. on the "B" stock, and £6 6s. p.ct. on the "D" capital (gas and water stocks).

The CHAIRMAN proposed a vote of thanks to the Secretary, the Engineer and Manager, their staffs and the employees generally for the services they had rendered during the half year. They all appreciated the excellent way in which the Secretary kept the accounts and presented the details; and they certainly owed very much to their Engineer (Mr. F. J. Bancroft) for the efficient way in which he carried on the business. He had had considerable difficulty in maintaining his stock of coal, and in obtaining the necessary supplies to carry on the works. He (the Chairman) must acknowledge the work that had been done by the staff in instructing the female labourers; and he hoped that the women who had been instructed would remain with the Company, be contented, and would not become agitators.

Mr. SAMUEL CUTLER, sen., in seconding, cordially agreed with the Chairman's remarks as to the thorough efficiency of the Engineer, and the constant anxieties he had had to meet. The Board fully appreciated what all the changes in materials and labour meant to Mr. Bancroft.

The motion was heartily passed.

Mr. DREW and Mr. BANCROFT both responded.

On the motion of Mr. F. R. SMITH, seconded by Mr. W. RICHARDS, the Chairman and Directors were cordially thanked for their services.

Thefts from the South Metropolitan Gas-Works.

At the Greenwich Police Court last Thursday, Joseph Crawley, engine fitter, of Tooting, pleaded guilty to stealing a brass flange and two gas-mantles, the property of his employers, the South Metropolitan Gas Company. Station-sergeant Nock stopped the prisoner coming from the direction of the Company's works at East Greenwich, and questioned him as to the contents of a parcel which he carried. First the prisoner said he had a flange which he was taking out for repair, and afterwards that he was taking it home from the works to make a pattern. The sergeant said he could not accept this story, and took him to the station. On the way, the prisoner said, "I did take it. I ought to have known better." Mr. P. Parrish, the Manager of the Company's Chemical Works, said that Crawley had worked there for two years; his wages for the past three months having been £5 weekly. There had been a number of these petty larcenies of late. Lubricators had been removed from running engines; and lead had been taken from various parts of the works. The Magistrate (Mr. Bingley): What I am astonished at is that a man earning £5 a week should descend to such a petty theft. Detective-sergeant Chatt said that, in addition to the Company's losses, there had been numerous thefts from the workmen's lockers. In prisoner's possession were three skeleton keys, which would fit almost any of the lockers. Mr. Bingley fined Crawley £5.

At the half-yearly general meeting this month of the British Gas Light Company, Ltd., the Directors propose to recommend, subject to audit, a dividend at the rate of 10 p.ct. per annum, with a bonus of 2s. 6d. per share, for the six months ended June 30, both less income-tax, and payable in October.

In the course of a discussion in the Dundee Gas Committee on the question of the utilization of coke to relieve the coal situation, Mr. High (the Convener) said the public did not seem to want coke; but if there was to be any shortage of coal in Dundee, the thousands of tons of coke which were at the gas-works would be at their disposal.

SALFORD GAS-WORKS ACCOUNTS.

The report of the Gas Committee to the Salford County Borough Council for the year ended March 31 (which is signed by the Chairman, Alderman F. S. Phillips, J.P.) states that there has been an increase of 2·44 p.ct. in the sales of gas.

The coal and cannel carbonized during the year amounted to 136,823 tons, as compared with 131,455 tons for the previous year. The quantity of gas made was 1,591,460,000 c.ft., as compared with 1,520,763,000 c.ft. The installation of vertical retorts is nearing completion; but the progress is at present slow, owing to the contractors being almost entirely engaged on works of urgent national importance. The total number of cookers, ordinary and prepayment, on hire at March 31 was 18,261; and the total number of gas-fires on hire at the same date was 3180. These figures show an advance on last year.

The expenditure during the year has again been exceedingly heavy, owing to advances in wages, increased war bonuses, additional payments to dependants of men on active service, a further advance in the cost of coal, and to continually rising prices of all the materials required. Since the close of the financial year, there have been two further increases in the price of coal, amounting together to 4s. per ton. The cost of wages for the ensuing year will very greatly exceed the cost of the past year, even if no further increases are granted, owing to the fact that the very large advance made under the award of the Committee on Production on March 27 did not come into operation until towards the end of the last financial year. It is also certain that there will be a further increase in the cost of all materials required during the current year. Against this enormous increase in expenditure, it is hoped there will be some improvement in the value of residuals; but this can only be small compared with the increased expenditure. The Household Fuel and Lighting Order, 1918, came into force on July 1; and it is feared that the operations of this Order will seriously reduce the output of gas, and consequently adversely affect the revenue of the undertaking to an extent which cannot yet be estimated. Owing to all the circumstances indicated, and to the fact that the Committee have no reserve fund to meet the situation, they will be compelled at an early date to consider the best means of increasing the revenue of the undertaking.

The statistical tables show that the make of gas per ton of coal carbonized was 11,632 c.ft., as compared with 11,569 c.ft. in the previous year. The unaccounted-for gas was 6·03 p.ct., as against 4·01 p.ct. The gross profit was £68,727. Interest and redemption fund charges amounted to £47,682, and contribution to the depreciation fund or expenditure on renewals to £17,635. The position as to the contribution to the district fund has already been explained [*ante*, p. 29].

INCREASED PRICES AT NOTTINGHAM.

The Nottingham Corporation Gas Committee have found it necessary to recommend a considerable advance in the price charged for gas. The matter came before the City Council at their meeting yesterday, when a report was dealt with recommending an increase of 8d. per 1000 c.ft., bringing the price to 3s. 6d., which is an advance of 1s. upon the rate obtaining eight years ago.

The new schedule, appertaining to gas for all purposes other than for power "gassing" (in lace trade work), and for motor vehicles and through prepayment meters, provides for a reduced charge of 3s. 5d. if the consumption is 1 million c.ft. and under 4 millions per quarter, and 3s. 4d. if the consumption is 4 millions and upwards. For power purposes, the new scale is 2s. 11d. per 1000 c.ft. for under 100,000 c.ft. per quarter; 2s. 10d. for 100,000 and under 200,000 c.ft.; 2s. 9d. for 200,000 and under 300,000 c.ft.; and 2s. 8d. for 300,000 or over. For motor vehicles supplied at Corporation works the charge is to be 4s. per 1000 c.ft., with a minimum rate of 1s., and 3s. 4d. when supplied to garages for resale—this being subject to payment for special meter services, &c. For supplies taken through prepayment meters, the charge is to be 1d. per 20 c.ft., instead of 25 c.ft. Prepayment customers have hitherto been treated with much consideration; the charges not having been increased in their case, except by the withdrawal of 1d. in the shilling rebate which was at one time allowed.

The Committee point out that since the last advance in the charge for gas, twelve months ago, there was a continual growth in the cost of coal and other materials connected with manufacture, and also in the cost of labour. Necessarily, the charges to consumers in extra-municipal districts will be higher than in the city itself; inhabitants of these areas having to pay 6d. per 1000 c.ft. more than consumers in Nottingham. While some advance is inevitable, consumers in the city are in many cases again taking the line of criticism that, under a system of doubtful finance, the gas concern is being made to contribute an unduly large proportion of money towards the alleviation of municipal burdens. Nottingham is attempting to attract new industries to its midst; but it is doubtful whether the increasingly high price of gas will contribute to the realization of this object.

Inferior Coal at Worthing.—It was reported by the Directors at the half-yearly meeting of the Worthing Gas Light and Coke Company on Saturday that in the early part of the year grave difficulties were experienced in obtaining sufficient coal; and the Directors were compelled to supplement the supply received from their contractors by the purchase of inferior coal from different sources. Though the profits for the half year were thus adversely affected, the results on the whole were not discouraging. The sales of gas increased by 6¼ p.ct. as compared with the corresponding period of 1917; and the constantly increasing cost of coal was to some extent counterbalanced by the better price obtained on the sale of residual products. The profit and loss account showed a balance of £22,204. Out of this sum, the Directors recommended the declaration of a dividend at the rate of 5 p.ct. per annum (less income-tax) upon the consolidated ordinary stock of the Company.

COAL CONTROLLER AND GAS-WORKS SUPPLIES.

The following statement on the subject of coal supplies has been issued by the Coal Control Office.

The position of gas and electricity undertakings is so serious as regards coal supplies that the Coal Control Department has been obliged to make special arrangements in cases where relatively large stocks are in hand. These are now being drawn upon to make good deficiencies of other undertakings not so well off for coal. The attitude of the distribution and supplies branch is that all public undertakings must be kept going so long as coal is available; and in the national interest those that have must be prepared to assist those that have not, until such time as the general position improves. Managers of public utility undertakings have real cause for anxiety—particularly gas-works, which are more restricted than electric stations in their choice of coal and its source of origin. The stocks of both are far below what they were at this time last year; and the position is an anxious one.

The London position particularly is a most difficult one, as some months ago 50 p.ct. of the boats engaged in the Durham and London coal business had to be diverted elsewhere. The coal that ordinarily would have come to London had to be promptly shipped to meet the urgent needs of France, when the German push interfered with output from the French coalfields. Therefore, in addition to the shortage of Durham coal, the control officials were faced with the almost insuperable problem of transport. They were obliged to attempt to make up the missing London supplies by bringing coal from Durham to London by rail. The main trunk lines on which the coal is carried are congested; and that is why the stocks on which London will this winter depend for its light and much of its warmth are still very short.

If more coal—much more coal—is got from the mines quickly, and if there is the most rigorous all-round economy (these are absolutely essential conditions), we may in the course of the next nine weeks be able to better the position.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 2.

In the London market interest is centred in the pitch situation. There are numerous inquiries, and the feeling is strong. The value is put at 62s. 6d. to 65s. net per ton *ex* makers' works for export. The home trade is also good. Large deliveries are being taken of tar materials for the roads. There is nothing to report as to other products.

Sulphate of ammonia continues to be taken quite as quickly as it is manufactured, at the official prices now ruling.

Tar Products in the Provinces.

Sept. 2.

The average values for gas-works products during the week were: Gas-works coal tar, 31s. 3d. to 35s. 3d. Pitch, East Coast, 37s. 6d. to 40s. per ton; West Coast—Manchester 25s. to 30s., Liverpool 25s. to 30s., Clyde 25s. to 30s. nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct. naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 3s 1d. to 3s. 2d. Heavy naphtha, North, 2s. 11d. to 3s. 1d. Creosote, in bulk, North, 4d. to 4¼d. Heavy oils, in bulk, North, 4¼d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 2s. 6d. to 2s. 9d. naked, nominal. Naphthalene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

With a continuation of the holiday season, which is usually a slack time of the year, no material alteration in conditions or quotations for tar products will have been looked for. Nevertheless, there are one or two features of interest which prove that matters are not altogether neglected. Most London makers are now asking 57s. 6d. per ton f.o.b. for pitch, and are doing a good export trade at this price; shipping facilities being more readily obtainable than some time ago. Provincial conditions do not change much. The railway companies are not anxious to accept pitch for carriage to London, and difficulties still occur in the arrangements for making shipments from the East Coast ports. Of course, if no improvement occurs in these conditions, and the Provinces are to be cut off from sharing in the export trade, either directly through Hull, Grimsby, or Goole, or indirectly through London, dull markets will speedily result. Meanwhile, prices remain practically without change. Solvent naphtha continues rather a weak spot, for which no particular reason can be assigned, and, when offered in bulk, makes no better than 2s. 6d. to 2s. 9d. per gallon, although, when inquired for, makers in near-by districts are able to obtain 3s. 3d. to 3s. 9d. per gallon. Heavy naphtha is much sought for, and is somewhat scarce, although no material alteration has occurred in quotations as yet. Crude naphthalenes continue in request, making £6 10s. per ton for low grades up to £14 10s. for better qualities. The refined is without alteration. Cresylic acid is firm at an average of 3s. 3d. per gallon in bulk, casks included. No action has yet been taken with regard to the price of benzol and toluol, and probably no improvement can be expected while only individual representations are made. Creosote is just about the same, and tar makes roughly 4d. per gallon in bulk. Aniline oil is 1s. 2d. per pound, and anthracene 6d. per unit per cwt. Carbolic acid, crude 60's, remains about the same; but an advance is more than likely in the near future, especially if 40 p.ct. crystals continue to make 1s. 2d. per lb. The range of quotations is as follows:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 2s. 6d. per gallon; crystals 40% 1s. 2d. per lb.

Crude Tar: London 32s. 6d. to 35s.; Midlands 27s. to 29s.; North 28s. to 30s. per ton *ex* works.

Pitch: London 57s. 6d. f.o.b. works; East Coast, 33s. f.o.b.; West Coast, 32s. to 33s. f.a.s.; Manchester, 32s. 6d. upwards; Clyde 32s. to 33s.; South Wales 42s.

Solvent Naphtha: London 3s. 3d. to 4s.; North and Midlands 3s. to 3s. 6d. per gallon.

Crude Naphtha: Naked 30% 8¼d. to 8½d.; North 6¼d. to 6½d.

Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4½d. (Government price, 75s. per ton f.o.b.—equal to 4⅝d. per gallon); heavy oil, 4¼d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

There has been no change in the position of sulphate of ammonia, which goes off as fast as it is made. Liquor is being taken in increasing quantities for munitions and the chemical industry. The demand this next season is expected to be much greater; while it is difficult to see how supplies can increase unless it be from synthetic processes, about which there is very little heard at present. The production of sulphate from gas-works is almost certain to decrease in the coming months, on account of the restrictions on coal supplies. Output at the pits is already below summer requirements, and replenishing of stocks is quite out of the question. It is extremely doubtful, too (much as one may hope for it), whether the coke-oven output of sulphate will increase, as even now it is not without difficulty that the bye-product coke-ovens are kept working. Altogether, therefore, the position is somewhat disquieting, and the market for the time being is existing on hopes and promises.

Newcastle Gas Company's Capital.—At a special meeting of the Newcastle-on-Tyne and Gateshead Gas Company, a resolution was passed giving the Board power to raise the £320,000 authorized by their Act of 1916, by the creation of redeemable debenture stock. Mr. J. E. Cowen, who presided, expressed deep regret at the deaths of Sir William Stephenson and Mr. Alfred Allhusen. He said the Directors had given careful consideration to the question of raising capital with a view to meeting the amount overspent on capital account, and paying off temporary loans. They had taken advice as to post-war money prospects, and had come to the conclusion that it was desirable to raise the whole of the sum authorized by the Act.

Romford Gas and Coke Company, Ltd.—It was reported at the recent half-yearly meeting that the revenue profit carried to profit and loss account for the six months ended June 30 was £3648. To this was added the sum of £10 for interest on mains laid on undeveloped estates, making a gross profit of £3658. This amount, added to the balance brought forward from the previous half year, made an available total of £7826. After providing interest on the reserve and insurance funds, debenture bonds, consumers' deposits, and bank overdraft, there remained a net balance of £7124, out of which the Directors recommended that dividends of 6⅜ p.ct. on the "original" shares, and 4¼ p.ct. on the "B" shares (both less income-tax) be declared for the half year. These dividends would amount to £2887, leaving £4236 to be carried forward. The sale of gas showed an increase of 5·33 p.ct. over the corresponding period of 1917. Owing to increases of wages, the 12½ p.ct. war bonus granted under the award of the Committee on Production, and the Board of Trade Order raising the price of coal, the Directors had been compelled to advance the price of gas 3d. per 1000 c.ft. as from Midsummer.

Jubilee at Eastbourne.—At the meeting of the Eastbourne Gas Company, the Directors recommended dividends for the past half year at the rate of 5½ p.ct. per annum on the "A" stock, 4 p.ct. on the "B" stock, and 5 p.ct. on the preference stock. These payments would absorb £5826, and leave a balance of £4793 to carry forward. The report stated that, owing to the increased cost of production, the Board had been compelled to advance the charge for gas 2d. per 1000 c.ft. as from January last. The Chairman (Mr. J. C. Towner) congratulated the meeting on gathering to commemorate the jubilee of the incorporation of the Company. The undertaking had never ceased to grow throughout all the fifty years; and they might look forward to continued efficient public service and prosperity. The Directors noticed with gratification that scarcely any of the Company's stock had been placed upon the market during the past year; the wiser course having been followed by trustees, of dividing holdings among beneficiaries. The number of stockholders had thereby grown considerably, and promised soon to reach 1000. As to the Act passed a few weeks ago, under which some measure of relief would be possible should the price of gas continue to increase, he saw little fear of gas rising to the figure contemplated by the minimum dividends proposed. The crowded condition of the town accounted for the fact that the consumption of gas had increased by nearly 5¾ p.ct. during the half year. The number of consumers also, despite the stoppage of building, had grown from 11,613 to 11,809. As to the accounts, a large income was balanced by a swollen expenditure; and the net result, though better than for the past three years, would not bear comparison with the days of peace. The works were in an efficient state; but there would be considerable leeway to make up, both on the works and as to mains and meters, when normal times returned. In this connection, he acknowledged the care and watchfulness of Mr. Frank H. Jones (the Consulting Engineer), Mr. J. S. Garrard (the Secretary), Mr. W. H. Hammond (the Works Manager), and other officers.

MAIN D. S. O. FIRES

FOR FUEL ECONOMY.

REDUCED TYPE.

"Dependable."

"Symmetrical."

"Original."

Hygienic and Efficient. Burners reversible, component parts interchangeable throughout the nine sizes to this type. Special Prices. The list price of the 10 inch size is 27/6, Round and Square patterns.

ORDER NOW WHILE MATERIAL IS AVAILABLE.

R. & A. MAIN, LTD.

WORKS: Gothic Works, EDMONTON, N. 18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOWROOMS and BRANCHES: 25, PRINCES STREET, OXFORD CIRCUS, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

Lighting of London.

Referring to the experimental scheme for securing the fullest economy, compatible with safety, in the street lighting of London, the details of which were given on p. 260 of the "JOURNAL" for Aug. 6, the daily papers last week pointed out that London street lighting is being cut down to an extent that will save more than one-half of the gas and electricity used in pre-war days. When the present arrangements are completed, economy in this direction will have gone as far as it can go, having regard to public safety and military requirements. In January, 1917, street lighting was found insufficient for public safety; a serious increase in the number of street accidents being reported. Improved lighting was secured by bringing into use the majority of the street-lamps in the Inner London area, and masking them in a fashion that met the requirements of the military authorities, and at the same time gave a well-diffused light for traffic purposes in the street. Meanwhile, for economy, many high-power lights had been put out of action and lower-powered lamps substituted. In this way, a considerable saving was effected. Afterwards, in the summer of 1917, in view of the increasing need for economy in the use of coal, the number of lamps was reduced by about one-third. The scheme now brought into operation provides for only half the number of lamps in use in pre-war days. In the outer portion of Greater London large economies have taken place. Where a hundred lamps were alight before the war, there may be now only from ten to twenty. In a good many of the outer areas no street-lamps are at present in use. Further to save lighting, a general instruction has been given that lamps are to be lit later in relation to sunset and extinguished earlier in relation to sunrise—always with due regard to the traffic requirements of the various districts. The suggestion that all, or a large proportion of, street-lamps should be put out of action on clear moonlight nights, is ruled-out as being impracticable.

A Ten Per Cent. Increase at Oxford.—In the twelve months ended June last, there was an increase in the sale of gas by the Oxford Gas Company of more than 35 million c.ft., or just over 10 p.ct. The quantity of coal carbonized was 1227 tons in excess of the previous year, or an increase of 3·4 p.ct. The leakage had been much reduced, though it is still about 11 p.ct. A considerable saving was effected in the cost of purification, owing to the use of oxide of iron in lieu of lime. At the meeting yesterday, the Directors reported that the higher cost of coal, other materials, and labour had made it necessary to raise the price of gas 4d. per 1000 c.ft. from Jan. 1 last—a further similar increase having to be made on July 1. They recommended the payment of the full statutory dividend for the past half year, at the rate of 5 p.ct. per annum on the preference and ordinary stock. For the previous six months, interim dividends were paid at the rates per annum of 5 p.ct. upon the preference and 6 p.ct. upon the ordinary stock.

Chester Gas Company and the Fuel Order.

The Chester United Gas Company, it was announced by the Chairman (Sir John Meadows Frost) at the recent meeting, are not likely to require to take advantage of the Statutory Undertakings (Temporary Increase of Charges) Act. Their maximum price is 4s. 6d. per 1000 c.ft., whereas they are now charging only 3s. 9d., with discount, and certain other voluntary concessions to consumers. The new Household Fuel and Lighting Order, he remarked, very nearly completes statutory control over all the Company's operations. The Company's working results had been improved in the past half year; and he thought they were now getting as good returns from the North Wales coal as it was capable of yielding. He testified to the loyal and willing assistance received from the Secretary (Mr. F. A. Pye), the Engineer (Mr. John H. Noble), the staff, and employees. The report for the six months ended June 30 stated that, as from March 31, the price of gas had been raised to 3s. 9d. per 1000 c.ft., bringing it to 50 p.ct. over pre-war rate, which must be regarded as a moderate increase, considering the fact of the further increase in the price of coal, and that the cost of nearly all other materials had been doubled, and wages have been raised in accordance with the general rates now prevailing. Under these circumstances, the accounts for the half year were satisfactory. After providing for interest on debenture stock and dividend on preference stock, there was a balance of profit of £4497 available for dividend on the ordinary stock; and the Directors recommended the payment of an interim dividend at the rate of 2½ p.ct. The Household Fuel and Lighting Order would involve a considerable amount of time and labour to carry out. Though it was impossible to foresee its full effect, it would most probably cause a reduction in the demand for gas; and should this be realized, it would mean a diminution of essential products for explosives and fuel oils obtained in the process of the manufacture of coal gas, which the country could ill-afford to lose at the present time. Therefore, when gas could be used, the option provided by the Order to surrender coal for an increased allowance of gas should be seriously considered.

At a meeting last week, the General Purposes Committee of the Brighouse Corporation were informed that the Committee on Production ruled that the lamplighters of the town do not count as gas-workers so far as concern the provisions of the award of 20s. per week above pre-war wages, *plus* 12½ p.ct. bonus on total earnings.

Municipal employees of all classes in the Calder Valley—embracing the borough and urban areas between Todmorden and Brighouse—are demanding increased wages to the extent of 30s. per week above pre-war rates. About a month ago, the Committee on Production awarded a 2s. advance, bringing the rates from 16s. to 18s. per week above pre-war rates. The Calder Valley Wages Board have declined to accede to the men's demands in view of this award; and the men have decided to tender their notices.

USE Simmance's

DEAD BEAT INDICATORS

instead of WATER-TUBE GAUGES and

"READ THE PRESSURE BY THE POINTER."

No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.

Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

Incorrodible, Accurate, for foul or purified gas.

MADE IN MANY RANGES WITH TABLETS LETTERED AS DESIRED.

ALEXANDER WRIGHT & CO., LTD., WESTMINSTER.

Agents: Australia—FYVIE & STEWART, 360, Collins St., Melbourne; Canada—W. P. ROPER, 502, Merchants' Bank Building, Montreal.

Bognor Gas Company.—It was pointed out at the half-yearly meeting of the Bognor Gas Company that the full dividends allowed by the sliding-scale had been earned, and a prudent allowance made for depreciation. An extraordinary meeting was held to authorize the Directors, should necessity arise, to avail themselves of the Statutory Undertakings (Temporary Increase of Charges) Act.

Irish Gas Prices.—On its being stated at a meeting of the Belfast Municipal Gas Committee that the increase in the price of coal and oil for the year would amount to £67,000, it was decided to recommend the Corporation to increase the price of gas, from September, for domestic purposes from 3s. 6d. to 3s. 9d. per 1000 c.ft., and for power from 3s. 1d. to 3s. 4d.; the amount of supply from automatic meters to be correspondingly lowered. It is expected that further increases will be necessary at a later stage. The Portadown Gas Company have decided to increase the price of gas from 5s. 5d. to 5s. 10d. The Navan Board of Guardians, on the suggestion of Mr. E. P. M'Carron (Local Government Board Auditor), appointed a Committee to inquire into the high cost of lighting. The Trim Urban Council are calling in a Dublin expert with regard to the high price of lighting and the urgency of more profitable working conditions. The Council have a lighting system of their own. The Navan Gas Company would, it seems, supply gas for public lighting at 10s. per 1000 c.ft.

Prospective Increase in Price at Leeds.—The Leeds Corporation Gas Committee have decided to recommend the City Council to increase the price of gas for lighting, cooking, heating, and power purposes 8d. per 1000 c.ft. from Oct. 1. The householder is now paying 3s. 4d., so that the suggested increase will bring the charge up to 4s. per 1000 c.ft. The present average price in Leeds for all purposes is about 2s. 11d. The chief reasons which have prompted the Committee to recommend such a big advance are the increase in the price of coal, the diversion of the South Yorkshire coal to the Midland area, and the substitution of Durham coal, upon which there are very heavy carriage charges, and the increased cost of labour and material. The coal bill will be increased by £157,000 as compared with the year ended March 31, 1914. Notwithstanding the introduction of labour-saving appliances, the wage bill has increased enormously, and will cost during the current year £90,000, or over 80 p.ct. more than the year 1914, and £35,000 extra during the current year. These two items in themselves justify an increase of 1s. 10d. per 1000 c.ft. over the pre-war price; whereas with the proposed advance of 8d. the price will only have been increased 1s. 6d. The consumption of gas will also be reduced owing to the operation of the Household Fuel and Lighting Order; and it is estimated that the revenue will suffer to the extent of from £25,000 to £30,000 per annum.

STOCK MARKET REPORT.

THINGS on the Stock Exchange last week might be pronounced to have been quite satisfactory if—a big *if*—only there had been a little more doing. But business has now got down to about the holiday low-water mark. The general tone was, of course, most cheerful, as might only be expected from the really astonishing achievements day after day of the Allied forces.

The gilt-edged market was very firm. Consols and all War Loans showed great strength; the 5 p.ct. Loan making a marked advance, and Exchequer Bonds being in much request. Indians were firm. Home Rails were inclined to oscillate. Canadians were in firmer favour; but Argentines were dull.

In the Foreign Market, a good feature was the strength of French Loans; and Japanese, Chinese, and Mexican were firm. Russians were flat for awhile, but recovered anon. South Africans were in demand. In the Miscellaneous Market there was most activity. Rubber was a little better and Oil was good. A large variety of concerns had supporters—Iron and Steel, Meats, Shipping, &c.

Business in the Gas Market bulked a fair amount in the aggregate, but it was most unevenly furnished, for one single issue outweighed all the rest, which, in contrast, were more than usually quiet. This notable exception was Imperial Continental, which was the focus of attraction and had a triumphal progress. It opened on Monday marking 105, touched 110 on Tuesday, 116½ on Wednesday, 119 on Thursday, and closed on Friday with 120. Though overshadowed thus, a measure of strength pervaded the entire list. A considerable number of quotations underwent variation, and with hardly an exception they were in the upward direction.

Bargains done for cash during the week were as follows: On Monday, British 30¾, Gas Light ordinary 64, 64¼, 65, Imperial Continental 105, 106, 106½, 107, Metropolitan of Melbourne 97½, Primitiva preference 56s., South Metropolitan 65½. On Tuesday, Continental Union 37, European 10½⅛, Gas Light ordinary 64½, 64¾, ditto maximum 53½, ditto preference 67½, 67⅞, 68, Imperial Continental 106½, 107, 107½, 108, 110, Primitiva 31s., ditto preference 56s., South Metropolitan 66½, South Suburban 70, ditto debenture 84, Tottenham debenture 62, Aldershot 5 p.ct. maximum 70. On Wednesday, Cape Town 3⅞, Continental Union 40, ditto preference 62, European 10¾, 10⅝, Gas Light ordinary 64, 64½, 64¾, ditto debenture 55½, Imperial Continental 109½, 110, 110½, 111, 111½, 112, 114, 115, 115½, 116, 116½, Primitiva 31s. 6d., South Suburban 70½. On Thursday, Alliance and Dublin 55¾, 56, British 30½, Continental Union preference 62, European 11⅛, Gas Light debenture 55⅞, Imperial Continental 115, 115½, 116, 116½, 116¾, 117, 118, 119, South Metropolitan 66, 66½. On Friday, British 30¾, Continental Union preference 64, 65, European 11⅛, 11¼, Gas Light ordinary 64½, 64⅝, 64¾, Imperial Continental 118, 118½, 118¾, 119, 119½, 119¾, 120, Oriental 104, Primitiva 32s. 6d., South Metropolitan 65½, 66, 66½, ditto debenture 54.

In the Money Market, there was a smart demand; but it tailed off towards the close of the week. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When Last Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	,,	April 8	2½	4⅜%	Alliance & Dublin Ord.	53—54	53—58	55¾—56
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	57—62	..
280,000	5	April 22	7½	8%	Bombay, Ltd.	5⅞—6⅜	5—5½	..
50,000	10	Feb. 26	16	11%	Bournemouth Gas and Water — 10 p.c.	29—30	30—32*	..
888,110	10	,,	7	7%	Bournemouth Gas and Water — B 7 p.c.	15—15½	10—11*	..
115,000	10	,,	6	6%	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	9—9½*	..
159,740	—	—	—	4%	Bournemouth Gas and Water — 4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	14%	Brentford A Consolid.	261—266	73—76	..
784,920	,,	,,	11	11%	Do. B New	204—209	65—68	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	77—82	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	62—64	..
317,880	,,	Feb. 26	11	9%	Brighton & Hove Orig.	208—213	135—140	..
344,300	,,	,,	8	6%	Do. A Ord. Stk.	154—159	95—100	..
680,000	20	Mar. 26	12½	22/6	British	44—45	30—31	30½—30⅞
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
345,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—53	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3⅜—4½	3⅝
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—8	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,513,280	,,	Feb. 12	5/9/4	36/-	Commercial 4 p.c. Stk.	106—108	56—61*	..
560,000	,,	,,	5½	30/-	Do. 3½ p.c. do.	103—105	53—58*	..
475,000	,,	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	,,	,,	4	—	Continental Union Ltd.	78—79	40—45	37—40
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	63—68	62—65
278,400	—	—	—	10½%	Croydon B and C 7 p.c.	..	140—150*	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	5½%	Derby Con. Stk.	128—135	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—88	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	10½—11½	10⅝—11½
16,398,975	Stk.	Feb. 10	4/17/4	29/4	Gas Light and Coke — 4 p.c. Ord.	98—102	63—65	64—66
2,500,000	,,	,,	3½	3½%	Gas Light and Coke — 3½ p.c. max.	76—79	52—54	53¾
4,062,325	,,	,,	4	4%	Gas Light and Coke — 4 p.c. Con. Pref.	96—99	66—68	67½—68
4,674,850	,,	June 11	8	8%	Gas Light and Coke — 3 p.c. Con. Deb.	72½—74½	54—56	55½—55⅞
180,000	,,	,,	10	10%	Gas Light and Coke — 10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	2⅜%†	Hastings & St. L. 3½ p.c.	87—89	46—51	..
70,000	10	April 29	11	8%	Hongkong & China, Ltd.	16½—16¾	7—8	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	115—125	..
131,000	Stk.	Mar. 12	7½	6¾%†	Ilford A and C.	151—154	90—95	..
65,780	,,	,,	6¾	4⅞%†	Do. B	115—118	70—75	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	117—122	105—120
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	70—72	..
235,242	,,	Mar. 12	6¾	6¾%	Lea Bridge Ord. 5 p.c.	119—121	92—97	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. — A	211—213	82—84	..
					Liverpool 5 p.c. Ord. — B	146—148		
308,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—78	..
75,000	5	June 11	6	3%†	Malta & Mediterranean	4½—4¾	3½—3¾	..
250,000	100	April 1	4½	4½%	Met. of Melbourne — 4½ p.c. Deb.	99—101	88—99	97½
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8¾—9½	..
1,875,892	Stk.	July 29	4½	3¾%	Newcastle&Gatsh'dCon.	98½—99½	64—66	..
529,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	89—93	59—61	..
55,940	10	Feb. 26	7/14/0	7%	North Middlesex 7 p.c.	14—15	9½—10½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	101—103	104
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	3—4	..
60,000	50	Feb. 26	13	9%	Portsea, Island B	128—131	73—78*	..
100,000	50	,,	13	8%	Do. C	118—121	73—78*	..
52,000	50	,,	10	6%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1½—1⅝	31/—32/6
499,960	5	June 26	5	2 6	Do. 5 p.c. Pref.	4⅝—5	2⅜—2⅞	56/-
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	75—77	..
—	—	—	—	4%	Do. ,, ,, 1911	..	50—55	..
346,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/-	San Paulo — 6 p.c. Pref.	10½—11	7½—7⅝	..
125,000	50	July 1	5	5%	San Paulo — 5 p.c. Deb.	4⅞—49	40—42	..
185,000	Stk.	Mar. 12	10	10%	Sheffield A	238—294	..	..
209,984	,,	,,	10	10%	Do. B	229—294	174—177	..
528,500	,,	,,	10	10%	Do. C	290—292		..
90,000	10	May 28	9	6/-	South African	10½—11½	1⅛—1⅜	..
6,609,895	Stk.	Feb. 10	5/4/0	32/-	South Met. 4 p.c. Ord.	111—113	66—67	65½—66⅜
250,000	,,	July 12	—	5%	Do. Pref.	..	91—98	..
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	53—55	54
224,820	,,	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	121—123	..
952,795	,,	,,	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	69—71	70—70½
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	73—75	..
135,000	—	—	—	3½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	83—85	84
647,740	,,	May 14	5	3%	Southampton Ord.	99—102	72—75	..
120,000	,,	Feb. 12	7½	5½%	Tottenham — A 5 p.c.	135—138	88—93	..
782,275	,,	,,	6	4%	Tottenham — B 3½ p.c.	115—117	64—66	..
181,255	,,	June 26	4	4%	District — 4 p.c. Deb.	87—89	61—63	62
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
235,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	87—88	..
30,000	,,	Feb. 26	8⅛	63/9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	83—93*	..
256,636	,,	,,	6⅜	48/9	Do. B 3½ p.c.	129—134	68—73*	..
108,075	,,	,,	5/17/8	44/7½	Do. C 3½ p.c.	110—115	68—73*	..
353,000	,,	,,	6⅜	42/6	Wimbledon 5 p.c.	117—122	68—73*	..
98,000	,,	,,	6⅜	48/9	Epsom 5 p.c.	121—126	68—73*	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	48—51	..

* Ex Div. † Next Dividend will be at this rate.

Increases in Gas Prices.—Consumers of gas at Hatherleigh (Devon) have been notified that the price of gas will be increased to 10s. per 1000 c.ft., and the meter rent raised. Prior to the Midsummer quarter, the price of gas was 7s. 1d.; and it was then advanced to 8s. 9d. There is to be a further increase in the price of gas to consumers by the Huddersfield Corporation. The new rates for lighting will be 3s. 6d. per 1000 c.ft., and for motive power users 3s. 3d. The prepayment meter consumers' discount is discontinued; and an additional charge of 6d. per quarter will be made for meter-rent. After some discussion, the Rawmarsh Urban District Council resolved to increase the price of gas 8d. per 1000 c.ft., making it 4s. 3d., which is the maximum allowed under the Order. The Swadlincote Urban District Council have decided to advance the price of gas to ordinary consumers within the district from 4s., 3s. 7d., and 3s. 6d. to 4s. 6d., 4s. 3d., and 4s. per 1000 c.ft. respectively, and to alter the prepayment meters to pass less gas per penny. With regard to ordinary consumers outside the urban area, the price will be increased from 3s. 6d., 3s. 9d., and 4s. 2d. to 4s. 8d., 4s. 9d., and 5s. per 1000 c.ft. respectively.

Prepayment Consumers and Gas Rationing.—It is officially announced that all automatic gas slot-meters are rationed; the basis of the rationing being the amount of money put into the slot-meter. A householder who has a slot-meter need not put in a requisition if he keeps within the following ration: 1 cwt. per week or a total of 2 tons 12 cwt. for the year; 22,500 c.ft. of gas (which allows for 7500 c.ft. for the winter quarter, less being consumed in the summer); and 120 units of electricity. The Coal Controller is advised that 40 p.ct. of the small slot-meter consumers (probably 50 or 60 p.ct.), will be entirely relieved from the procedure laid down under the House hold Fuel and Lighting Order.

The advent of the local general holidays at Bingley, Yorkshire, last week, saved an awkward situation in regard to gas service. Owing to coal shortage at the works, the district was within a few hours of a total stoppage of gas supply; but the closing-down of mills and workshops, and the reduction in household consumption owing to people going away, enabled the crisis to be avoided without the public knowing anything about the matter.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

ENGINEER. No. 6492.
ENGINEER AND MANAGER. Annfield Plain Gas Company.
JUNIOR CHEMIST (Male or Female). No. 6487.
DRAUGHTSMAN. No. 6476.
RETORT HOUSE FOREMAN. Stretford Gas Company.
FOREMAN FITTER. No. 6485.
ACCOUNTANT CLERK. No. 6489.
CLERK. Seaford Gas Company.
FOREMAN. No. 6490.

Appointments, &c., Vacant (*Continued*).

FOREMAN FITTER. Saltley Gas-Works, Birmingham.
GENERAL FOREMAN. Keighley Gas Department. Applications by Sept. 25.
METER REPAIRERS AND TESTERS. Portsea Island Gas Light Company.
PURIFYING FOREMAN. Saltley Gas-Works, Birmingham.

Appointments, &c., Wanted.

ENGINEER, &c. (Discharged Officer). No. 6491.

Plant, &c., for Sale.

PURIFIERS. Shirebrook Gas-Works.
REVAL HEADS. Cardiff Gas Company.
METER. William Dixon, Ltd., Glasgow.
STEAM ENGINE AND EXHAUSTER. Cambuslang Gas Works.

Plant, &c. (Second Hand) Wanted.

PRESSURE PLANT OR GASHOLDER. Gems, N. Kensington

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders to Alter or stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Saturday.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 23s. 6d.; Half Year, 12s.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, an extra charge of 4s. a year is made.

Abroad (in the Postal Union): £1 7s. 6d., payable in advance.
In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

BRITISH GAS PURIFYING MATERIAL.

ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Chief Proprietor and Managing Director.)
13, ARCADIAN GARDENS, WOOD GREEN, LONDON, N. 22.
Telegrams: "Bripurimat, Wood, London." 'Phone: Palmer's Green 608.

JAMES MILNE & SON, LTD.,
(ESTABLISHED 1750.)

SLOT AND ORDINARY DRY METERS.

EXTENSIVE RANGE OF USEFUL GAS WORKS' ACCESSORIES.

EDINBURGH, GLASGOW, and LEEDS.

ALDER AND MACKAY, LTD.
(ESTABLISHED 1850).
WET AND DRY METERS,
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS.

EDINBURGH.
(See p. 457.)

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

BENZOL PLANTS FOR GAS-WORKS.

BAGLEY, MILLS, & CO., Ltd.,
92, Victoria Street, Westminster, S.W. 1, Invite inquiries from all Gas-Works making 75 million cubic feet and upwards per annum.

SULPHURIC ACID.

SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD., with which is amalgamated WM. PEARCE & SONS, LTD., Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—1588 AVENUE (3 lines).

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams—"SATURATORS, BOLTON." Telephone 0848.

MEWBURN, ELLIS, AND PRYOR.
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70, Chancery Lane, London.
Telegrams: "Patent, London." 'Phone: 243 Holborn.
And 8, St. Nicholas Buildings, Newcastle-on-Tyne.

"FERROX." "FERROX." "FERROX."

A BRITISH Oxide Cheaper and Better than Bog Ore. 35 per cent. Water, 75 per cent. Ferric Hydrate.
For Sale outright or on Loan.
OXIDE LIMITED, Brentford, MIDDLESEX.

OXIDE OF IRON.
SPENT OXIDE WANTED.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

"TORTO" FIRE CEMENT.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

HUTCHINSON BROTHERS, Ltd.,
FALCON WORKS, BARNSLEY.
MANUFACTURERS OF
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS and SQUARE LANTERNS for Street Lighting,
INVERTED BURNERS and CONVERSION SETS for Street Lamps.

ENQUIRIES SOLICITED

FOR Gas-Works Plant of Every Description; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.
C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

SEND your inquiries for Carburetted HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS to—
BALE AND HARDY,
39, VICTORIA STREET, WESTMINSTER, S.W. 1.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid Carbolic Acid, Sulphate of Ammonia, &c.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, ROSE MOUNT IRONWORKS, ELLAND.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide L'ghtly.

See Illustrated Advertisement, Aug. 20, p. 368.

JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the best. Satisfaction Guaranteed.

CITY AND GUILDS GAS EXAMINATIONS.

MR. CRANFIELD'S well-known CORRESPONDENCE CLASSES enable Students to surmount the War Time difficulties of Scanty Leisure and the Scarcity of Classes. Individual Attention given to Students, and the Highest Results obtained Year by Year.

Full Particulars on Application to MANOR COURT AVENUE, NUNEATON.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.

PENNINGTONS ENGINEERING TUTORS, 254, Oxford Road, MANCHESTER.

OFFICER (Royal Engineers) about to get Discharge from Army after 3½ Years' Active Service, is open to Take Up Professional Duty with Gas Undertaking or Gas Engineering Firm, towards the end of September.

Details of Professional Experience and previous Appointments supplied on application to No. 6491, care of MR. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

ANNFIELD PLAIN AND DISTRICT GAS COMPANY.

THE Directors of the Annfield Plain and District Gas Company invite Applications for the Position of RESIDENT ENGINEER and MANAGER. Annual make, 25,000,000 c.ft. of Gas. Gas Engineer is required who is thoroughly Progressive and Active, able to Control, and Experienced in Management.

Convenient House in Fore Street Annfield Plain (Co. Durham), away from the Works, provided with Gas and Coal free.

Applications, stating previous Experience, Age, and Salary expected, should be addressed to the undersigned.

W. M. BATTERHAM.

50, Cannon Street,
London, E.C.,
Aug. 27, 1918.

WANTED, by a Company on the South-East Coast, an ENGINEER with an up-to-date knowledge in Manufacture and Distribution of Gas, a Capable Draughtsman, and a General Knowledge of Chemistry (annual make, about 375,000,000 c.ft.).

Applications, by letter, stating Salary required, Age, and Qualifications, together with Three References, to be sent to No. 6492, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

JUNIOR Chemist, Male (Ineligible for Military Service) or Female, for routine Works Tests at a Midland Gas-Works.

Applications, by letter, stating full Technical Qualifications and Salary required, to No. 6487, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

BATTERSEA POLYTECHNIC,
LONDON, S.W. 11.

Principal:
F. H. NEWMAN, M.A., Ph.D.
Head of Chemical Department:
J. WILSON, M.Sc., F.I.C.

THREE YEAR DAY COURSES in
CHEMISTRY,
PHYSICS,
MATHEMATICS,
ENGINEERING, and
GAS MANUFACTURE, &c.,
for Students desiring to enter the Gas Industry.

DAY and EVENING COURSES in
INORGANIC, ORGANIC, and
PHYSICAL CHEMISTRY,
PHYSICS, &c.,
for London University B.Sc. (Pass and Honours), and for Institute of Chemistry Examinations.

For further Particulars of the above, and of the SPECIAL EVENING COURSES in APPLIED CHEMISTRY (including Coal Tar Dyestuffs and Intermediate Products), apply to the SECRETARY.

DRAUGHTSMAN Wanted for Controlled Firm of Constructional Engineers in Birmingham.

Apply, by letter, stating Age, Salary required, and full Particulars, to No. 6476, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

ACCOUNTANT Clerk wanted at large Provincial Gas Undertaking, as ASSISTANT in Audit Department. Must be thoroughly conversant with Up-to date Systems of Accounting.

Apply, by letter, stating full Particulars of Experience, Age, and Salary required, with Testimonials, to No. 6489, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

THE Seaford Gas Company, Ltd., require an Experienced CLERK (Male or Female) conversant with the routine of a Gas Company's Office. Typist preferred.

Apply, by letter, stating Age, Experience, and Salary required, to the SECRETARY, Seaford Gas Company, Ltd., SEAFORD, Sussex.

WANTED for Gas-Works in Surrey (Make of Gas, 135 Millions) a FOREMAN with Mechanical and Workshop Experience. Good Carboniz r. House, Coals, and Gas Free.

Apply, by letter, stating Age, Qualifications, and Wages required, to No. 6490, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

KEIGHLEY CORPORATION.
(GAS DEPARTMENT.)

GENERAL Foreman required. Must be good Carbonizer, with Experience in the Maintenance of Electrical and Mechanical Machinery and Plant, and able to Control Workmen.

Applications, endorsed "Foreman," stating Age, whether Married or Single, Remuneration required, and giving full Particulars of Experience, to be addressed to the undersigned not later than Sept. 25, 1918. References required.

W. BAILLIE,
Engineer and Manager.

Gas Offices,
Cook Lane, Keighley,
Aug. 31, 1918.

CITY OF BIRMINGHAM.
(GAS DEPARTMENT.)

PURIFYING Foreman required for the Adderley Street Works. Make of Gas, 2¾ Millions per day. Wages, including Bonus, 71s. 6d. per Week, *plus* 12½ p.ct.

Apply, stating Age, Experience, and Testimonials, to The ENGINEER, Gas-Works, Saltley, BIRMINGHAM.

CITY OF BIRMINGHAM.
(GAS DEPARTMENT.)

FOREMAN Fitter required at the Adderley Street Gas-Works. One preferred with Experience of Fiddes-Aldridge, Telpher, and Electrical Plants, and with all-round General Experience. Wages, including Bonus, 83s. 6d. per week, *plus* 12½ p.ct.

Apply, stating Age, Experience, References, &c., to The ENGINEER, City Gas-Works, Saltley, BIRMINGHAM.

STRETFORD GAS COMPANY.

RETORT-HOUSE Foreman wanted (450 Million Works), Electrical-Driven Charging Machine and Telpher, Tar Towers, Regenerator Furnaces. Eight-Hour Shifts. Wages, 77s. 6d. for Seven Days, *plus* 12½ p. ct.

Apply, with Testimonials, to the Engineer and Manager, Gas-Works, Stretford, near Manchester.

H. KENDRICK,
Engineer and Manager.

Aug. 20, 1918.

WANTED (in the Eastern Counties), First-Class FOREMAN FITTER for Distribution Department. Must have Experience of Gas-Engines, Fires, Geysers, &c. Able to advise Consumers and Control Men. Excellent Opportunity for Suitable Man.

Apply, by letter, stating Age, Experience, and Wages required, to No. 6485, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

THE Portsea Island Gas Light Company, Rudmore Works, want Experienced METER REPAIRERS; also METER TESTERS. References required.

Apply, in writing, to J. D. ASHWORTH, Engineer and General Manager, Gas Offices, Commercial Road, PORTSMOUTH.

WANTED—Pressure Plant for 40 H.P. Suction Gas-Engine or GASHOLDER about 3000 c. ft. Capacity.

State full Details and Price to GEMS, 43-45, Lancaster Road, NORTH KENSINGTON.

COAL Tar Pitch, 5000 to 6000 Tons.— WANTED, Lowest Price Contract, 5000 to 6000 Tons of COAL TAR PITCH, in Lots of 100 to 500 Tons, over Next Six Months. Works Quotations.

Address No. 6488, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED.—Crude Coal-Gas Tar in Kent, Surrey, or Sussex, loaded into Buyers' Casks or Railway Tank-Wagons.

JOHNSON, Tar Distiller, LARKFIELD, Kent.

FOR SALE—Four Water-Lute PuriFIERS, 10 ft. square, with 10-in. Centre Valve, Connections, and Cover Lifting Apparatus, consisting of four Columns, lattice Girders, and two Carriages.

For further Particulars and Price, apply to the MANAGER, Gas-Works, SHIREBROOK, nr. Mansfield.

FOR SALE.—Steam Engine and ExHAUSTER, Three Blade (Laidlaw), 12,000 to 15,000 c.ft. per hour. In Good Condition.

Apply to the MANAGER, Gas-Works, CAMBUSLANG.

THE Cardiff Gas Light and Coke Company have for Disposal about 200 NEW CAST STEEL RAVEL HEADS for Hand Stoking, pre-war Stock, approximately half this quantity being 12 in. heads and the remainder 9 in. heads, with the Welding Handles 15 in. and 24 in. respectively.

This stock may be viewed at the Grangetown Gas-Works, Cardiff, and is ready for immediate Loading.

Buyer must obtain Ministry of Munitions Priority Permit.

Further Particulars and Information upon Application.

GEORGE CLARRY,
General Manager and Secretary.

FOR SALE.—Gas Meter by Laidlaw, Edinburgh, capacity 24,000 Cubic Feet per Hour. Only used a few days.

Particulars from WILLIAM DIXON, LTD., Ironmasters, GLASGOW.

CAST-IRON PIPES FOR GAS, WATER, & STEAM, also VALVES of all descriptions.

R. LAIDLAW & SON, LTD., ALLIANCE FOUNDRY, 147, MILTON STREET, GLASGOW. OFFICE: 147, MILTON STREET, GLASGOW.

GASHOLDERS.

WESTWOOD & WRIGHTS.
BRIERLEY HILL.

GAS PLANT OF EVERY DESCRIPTION & SIZE.
PRESSURE RELIEVERS FOR GASHOLDER CUPS.
GAS VALVES WITH PATENT INDICATORS & LUBRICATING FACES.
MOUTHPIECES with DETACHABLE FACES, also AUTOMATIC FASTENINGS
FURNACE & OTHER DOORS, also MOUTHPIECES with ASBESTOS JOINTS.
STRUCTURAL IRON AND STEEL WORK.